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TITLE OF INVENTION

Computer Architecture and Process for Audio Conferencing Over Local...

APPLICANT(S) FOR DO/EO/US

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Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

1. ☒ This is a **FIRST** submission of items concerning a filing under 35 U.S.C. 371.
2. ☐ This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 35 U.S.C. 371.
3. ☐ This is an express request to begin national examination procedures (35 U.S.C. 371(f)). The submission must include items (5), (6), (9) and (21) indicated below.
4. ☒ The US has been elected by the expiration of 19 months from the priority date (Article 31).
5. ☒ A copy of the International Application as filed (35 U.S.C. 371(c)(2))
 - a. ☐ is attached hereto (required only if not communicated by the International Bureau).
 - b. ☐ has been communicated by the International Bureau.
 - c. ☒ is not required, as the application was filed in the United States Receiving Office (RO/US).
6. ☐ An English language translation of the International Application as filed (35 U.S.C. 371(c)(2)).
 - a. ☐ is attached hereto.
 - b. ☐ has been previously submitted under 35 U.S.C. 154(d)(4).
7. ☒ Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371(c)(3))
 - a. ☒ are attached hereto (required only if not communicated by the International Bureau).
 - b. ☐ have been communicated by the International Bureau.
 - c. ☐ have not been made; however, the time limit for making such amendments has NOT expired.
 - d. ☐ have not been made and will not be made.
8. ☐ An English language translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371 (c)(3)).
9. ☐ An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)).
10. ☐ An English language translation of the annexes of the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5)).

Items 11 to 20 below concern document(s) or information included:

11. ☐ An Information Disclosure Statement under 37 CFR 1.97 and 1.98.
12. ☐ An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.
13. ☐ A **FIRST** preliminary amendment.
14. ☐ A **SECOND** or **SUBSEQUENT** preliminary amendment.
15. ☐ A substitute specification.
16. ☐ A change of power of attorney and/or address letter.
17. ☐ A computer-readable form of the sequence listing in accordance with PCT Rule 13ter.2 and 35 U.S.C. 1.821 - 1.825.
18. ☒ A second copy of the published international application under 35 U.S.C. 154(d)(4).
19. ☐ A second copy of the English language translation of the international application under 35 U.S.C. 154(d)(4).
20. ☐ Other items or information:

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COMPUTER ARCHITECTURE AND PROCESS FOR AUDIO
CONFERENCING OVER LOCAL AND GLOBAL NETWORKS INCLUDING
INTERNETS AND INTRANETS

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RELATED APPLICATIONS

This application claims priority to U.S. Provisional Application No. 60/096,865, filed August 17, 1998, U.S. Provisional Application entitled "COMPUTER ARCHITECTURE AND PROCESS FOR AUDIO CONFERENCING OVER LOCAL AND GLOBAL NETWORKS INCLUDING INTERNETS AND INTRANETS," filed July 20, 1999, and having Attorney Docket No. 113239-401, Application No. 60/144,729, U.S. Provisional Application entitled "COMPUTER ARCHITECTURE AND PROCESS FOR AUDIO CONFERENCING OVER LOCAL AND GLOBAL NETWORKS INCLUDING INTERNETS AND INTRANETS," filed August 6, 1999, and having Attorney Docket No. 113239-403, Application No. -----, all incorporated herein by reference.

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FIELD OF THE INVENTION

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The invention relates, in general, to a computer-implemented method and system for providing audio conferencing over computer networks, and, in particular, to a computer-implemented method and system for providing audio conferencing over global or local networks, such as the Internet and/or the World Wide Web with audiovisual and/or avatar functionalities, as described herein.

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BACKGROUND OF THE INVENTION

In recent history, computers have become much more pervasive in society. In addition, increases in power, speed, and storage capabilities have enabled the necessary infrastructure for computers to network effectively.

One of the more publicized computer networks in existence is the Internet. The Internet is a connection of standard computers using the standard TCP/IP communications protocol. The Internet has evolved to include a user-friendly graphical interface known as the World Wide Web ("WWW" or "the Web"). The World Wide Web allows users to access information by indicating a location of desired information or by traversing standard hyper-text links, which cross-reference information in many different locations on the Internet. This is made possible by implementation of a standard universal resource locator ("URL") as a way of locating information on the Web.

Access to the Web is accomplished, for example, using a standard phone line, a standard computer, and a standard web browser, such as Netscape Navigator by Netscape Communications Corporation, of Mountain View, CA, or Internet Explorer by Microsoft Corporation of Redmond, WA.

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As discussed in U.S. Patent No. 5,880,731 to Liles et al., incorporated herein by reference, one of the more common options for enabling several users of an on-line service to interact is through a chat session. A user joining a chat session is added to a list of participants and can then view text comments input by other participants via a keyboard, and enter and transmit a text response. In text only chat sessions, each user's screen is divided into two panes. Comments that have been transmitted by those participating in the chat session appear in one pane, and any message being entered by the user appears in the other pane on the user's computer display screen. For practical reasons, chat sessions are usually limited to a predefined number of participants. If any person attempts to join once the limit is reached, the person is typically notified that the chat session is full and the person is precluded from joining.

Alternatively, the person is offered the opportunity to join another separate chat session on the same topic in which others are participating. In chat sessions, involving a well-known personality, hundreds of people may join a chat session, but only the host and the moderator are active in the chat session, and all others are simply observers. However, provision may be made to enable questions

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previously submitted by the observers to be displayed to solicit a response from the guest.

The host controls the chat session. The virtual space in which each chat session occurs is sometimes referred to as a "chat room," because the participants interactively communicate just as if they were meeting in a room.

Liles et al. further discusses that with the increasing use of modems operating at speeds of 28.8 Kbps on commercial networks, graphical chat sessions are becoming more practical than previously possible. In a graphical chat session, all of the participants are represented by avatars or icons that are grouped in a graphic environment or "world." In addition to a graphic window showing the chat world, the display screen on each participant's computer typically includes that chat pane and the message entry chat pane. When another user joins the chat session, the person's identifier, moniker, or name is added to a list of the participants, and an avatar of the new participant is added to the graphic chat world. The list normally appears in a third member pane. When any participant leaves the chat session, the withdrawal is noted in the member pane, and the avatar representing the person is removed from the graphic chat world.

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Liles et al. recognize that the above-described chat world is stilted and artificial because it fails to convey the personality and emotional state of the participants as the chat sessions progresses. Liles et al. addresses this problem by providing animation to the user's avatar to effect a gesture that conveys an emotion, action, or personality trait. A selected gesture is transmitted with a text message to convey the user's emotional state.

However, we recognized shortcomings in graphical text-only chat worlds, as described in Liles et al. Specifically, a sentence is inputted through operation of a keyboard. Communication speed is thus limited by keyboard entry. We have appreciated that it is unrealistic to expect all users to have typing skills on par with professional typists who can type at a rate equivalent to normal speech, which we believe is the optimum mode of communication. The result achieved by Liles et al. is still stilted and artificial because it fails to convey the personality and emotional state of the participants as the chat sessions progresses. In addition, the Liles et al. apparatus slows down the rate of communication between users even further by forcing users to choose relevant gestures to accompany their text messages. To this extent, nothing in Liles et al. teaches real-time voice communication over a computer network.

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U.S. Patent No. 5,930,752 to Kawaguchi et al., incorporated herein by reference, discloses a problem typical users have in operating a keyboard for Japanese syllabary-to-Chinese character transformation in a conventional chat session. That is, the complexity of the keystrokes inhibits input speed. Kawaguchi et al. addresses this problem using a system in which a conversation is effected through speech. Specifically, Kawaguchi et al. discloses an audio interactive system including a plurality of terminals, each having audio input means for converting voices into aural signals and an audio output means for converting aural signals into voices. The plurality of terminals are connected to a communication line. A server is connected to the plurality of terminals via the communication line to perform collection and distribution of the aural signals, in which a conversation is made through voices being transmitted between the plurality of terminals. The server comprises a buffer for temporarily storing the aural signals transmitted from the terminals. A scheduler controls the distribution of the aural signals in the buffer in a first-in-first-out priority scheme.

We have recognized that a system, such as that disclosed in Kawaguchi et al., necessarily prevents rather than promotes real-time voice communication. That is, each user's voice input is stored in a

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buffer, thereby creating an inherent lag time or delay prior to transmission.

5 Kawaguchi et al. also discloses a modified embodiment of the above-described system including a display screen including icons representing users. The speaker is identified by "balloons," and the intended listener is identified by an illustration of a "calling tone." Intended listeners are selected by the speaker by clicking on the respective screen icons using a mouse.

10 We have recognized that a system, such as the modified embodiment of Kawaguchi et al., fails to overcome the shortcomings of the original embodiment of Kawaguchi et al. That is, the modified embodiment still fails to provide real-time voice communication between users in a natural or comfortable way amongst one or more, or even all, users in a chat room.

15 Accordingly, neither Liles et al. or Kawaguchi et al. address or relate to an overall system architecture and/or method for effective aural conferencing over global and/or local computer networks, including effective management of such aural conferences.

20 We have recognized that it would be desirable to have a system and/or a method for graphically representing users in an aural chat room accessible via a computer network.

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We have recognized that it would be desirable to have such a system and/or method include real-time voice communication amongst users in the chat room.

We have also recognized that it would be desirable to have such a system and/or method include real-time, e.g., substantially simultaneous or concurrent, text communication and/or data file transfer amongst users in the chat room.

We have also recognized that it would be desirable to have such a system and/or method include real-time voice communication amongst users in the chat room according to a predetermined user priority scheme.

We have further recognized that it would be desirable to have such a system and/or method include real-time, e.g., substantially simultaneous or concurrent, text communication and/or data file transfer amongst users in the chat room according to a predetermined user priority scheme.

We have further recognized that it would be desirable to have such a system and/or method include real-time voice communication amongst selected users in the chat room.

We have recognized that it would be desirable to have such a system and/or method including real-time, e.g., substantially simultaneous or concurrent, text

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communication and/or data file transfer amongst selected users in the chat room.

We have recognized that it would be desirable to have a system and/or a method for graphically representing users in an aural chat room accessible via a computer network, wherein the system architecture is readily scaleable to accommodate geographical, server processing power, increasing subscriber attendance, and/or data storage limitations.

We have also recognized that it would be desirable to have such a system and/or method include real-time voice communication amongst users in the chat room, wherein the system architecture is readily scaleable to accomodate geographical, server processing power, increasing subscriber attendance, and/or data storage limitations.

SUMMARY OF THE INVENTION

It is, therefore, a feature and advantage of the instant invention to provide a system and/or a method for graphically representing users in an aural chat room accessible via a computer network.

It is another feature and advantage of the instant invention to provide such a system and/or method including real-time voice communication amongst users in the chat room.

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It is also a feature and advantage of the instant invention to provide such a system and/or method including real-time, e.g., substantially simultaneous or concurrent, text communication and/or data file transfer amongst users in the chat room.

It is another feature and advantage of the instant invention to provide such a system and/or method including real-time voice communication amongst users in the chat room according to one of several possible predetermined user priority schemes.

It is also a feature and advantage of the instant invention to provide such a system and/or method including real-time text communication and/or data file transfer amongst users in the chat room according to a predetermined user priority scheme.

It is yet another feature and advantage of the instant invention to provide such a system and/or method including real-time voice communication amongst selected users in the chat room.

It is also a feature and advantage of the instant invention to provide such a system and/or method including real-time, e.g., substantially simultaneous or concurrent, text communication and/or data file transfer amongst selected users in the chat room.

It is still another a feature and advantage of the instant invention to provide a system and/or a method for graphically representing users in an aural

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chat room accessible via a computer network, wherein the system architecture is readily scaleable to accommodate geographical, server processing power, increasing subscriber attendance, and/or data storage limitations.

It is also a feature and advantage of the instant invention to provide such a system and/or method including real-time voice communication amongst users in the chat room, wherein the system architecture is readily scaleable to accommodate geographical, server processing power, increasing subscriber attendance, and/or data storage limitations.

The instant system includes a revolutionary computer network conferencing system which, for example, takes chat to new dimensions. By way of illustration, an embodiment of the instant invention allows small groups of two to four people participate in real time audio chat, using lifelike animated characters in a 3-D environment.

Participants, for example, create their own chat sessions and select from many avatars to simulate human conversation, with moving lips, turning heads, gesticulating hands and moving feet. The 3-D environment features, for instance, speaker identification tools to indicate who is speaking and who is waiting to speak, optional moderator control, a text chat screen for type chat communication, a

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participant identification window, and/or person-to-person quick file transfer.

Another embodiment of the instant invention includes a library of, for example, over 1,000 life-like avatars. This embodiment, for example, offers guests to one's virtual community the ability to create their own avatars with a graphical toolkit provided with the instant invention. Users, for example, scan their own photos into the program to create a character that looks like themselves.

Another exciting feature of this embodiment is the variety of graphical interface options. For example, this embodiment includes a library of themed rooms for special interests such as sports, news, and travel. Each themed 3-D rendered room optionally includes a message board and/or a topic-specific news flash capability to keep users up to date and in touch with one another. Other exemplary functions includes white boarding and file sharing for presentations, scheduling of sessions and topics, and tracking of user demographics and preferences.

This embodiment, for example, also includes an auditorium feature so that animated featured guests appear and interact with large audiences. By way of illustration, this embodiment includes the ability to record transcripts for each or any such event and make them available for search and retrieval using standard

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file search, retrieval, and presentation engines. For example, this embodiment further includes standard close captioning, which converts voice to text and text to voice. Another exemplary feature includes a call screening capability to screen out unwanted users.

More specifically, the instant invention provides a system for providing at least one forum for communication to a plurality of users operating clients communicatable with a computer network. By way of illustration, clients include stand-alone or browser-based software applications that users manipulate, for example, to take part in a voice conference according to the instant invention. The system includes a conference server or manager communicatable with the computer network for hosting one or more forums, and for managing graphical representations of clients in the forums. The system also includes a multi-point control unit server or manager communicatable with the computer network for transmitting voice communication in real-time from a speaking user to the remaining users in the at least one forum.

The system optionally further includes an audio/video communications server communicatable with the computer network for negotiating an initial connection between a new client, the conference server, and the control unit server. The system

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optionally further includes a multi-conference manager communicatable with the computer network for routing one or more clients to an available forum. The routing, for example, occurs regardless of the forum's location on any given server.

The system optionally further includes one or more multiple conference servers including the conference server, the control unit server, the communications server, and the multi-conference manager. The multi-conference manager optionally provides, upon client request, asynchronous communication and/or synchronous communication to clients prior to entering the available forum. Optionally, the multi-conference manager provides, upon client request, a new forum.

Optionally, the conference server maintains a real-time voice queue for each forum. In such an embodiment, the control unit server optionally permits the voice communication based on a client speech request order on the voice queue.

The conference server optionally maintains a real-time text queue. In such an embodiment, the conference server optionally transmits text communication based on a client text transfer request order on the text queue from a text sending client to one or more text receiving clients.

The conference server optionally maintains a data file queue and transmits at least one data file based on a client text transfer request order on the data

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file queue from a data file sending client to one or more data file receiving clients. The client speech request order is optionally based at least partially on a hierarchy of classes of clients. The classes of clients optionally include a participant class of clients and a moderator class of clients which outranks the participant class. The client in the moderator class is optionally authorized to determine the client speech request order. Alternatively, or in addition, the classes of clients optionally include a participant class of clients, an expert class of clients and/or a panel member class of clients. The expert class and the panel member class of clients both outrank the participant class. Each forum optionally includes a whisper functionality or private conference within the on-going or active conference, upon client request.

Optionally, the one or more multiple conference servers includes a plurality of multiple conference servers. The system further includes a master server controlling access by potential clients to the plurality of multiple conference servers. Optionally, the computer network includes an intranet and/or the Internet, and/or World Wide Web access. The audio/visual communications server optionally includes a standard voxilla server. The graphical representations of the clients optionally include avatars of the clients.

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The asynchronous communication optionally and advantageously includes text-based chatting, electronic mail, message boards for voice and/or text messages, and/or whiteboards. The synchronous communication includes at least one of real-time aural chat sessions and real-time text chat sessions. Optionally, conference server supports the real-time text chat sessions using standard Transmission Control Protocol/Internet Protocol ("TCP/IP"). Optionally, the control unit server supports real-time aural chat sessions including streaming data, such as streaming sound or streaming media, using, for example, standard User Datagram Protocol ("UDP") communications protocol. Other types of streaming data, such as streaming video and digital data, are acceptable. Other standard communications protocols as well as standard audio and video codecs are also acceptable for supporting real-time text and/or aural communications over a computer network.

Optionally, each client includes a client interface. The client interface optionally includes a graphical main window for displaying one or more of the graphical representations of clients. The client interface optionally includes a sound control menu for adjusting one or more sound settings on the client, an avatar selection menu, an on-line client window for identifying on-line clients, a communications window, and/or a forum creation functionality.

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The sound control menu includes a speaker meter, a speaker volume selector, a microphone sensitivity meter, and/or a microphone sensitivity selector.

5 The avatar selection menu optionally displays a plurality of selectable avatars. The avatar selection menu optionally includes an avatar import functionality and/or an avatar customization functionality. The on-line client window optionally includes an invite functionality for inviting another client to a new forum, and/or a join forum functionality for joining other clients in an available forum.

10 The communications window optionally includes a speech request functionality, a cancel speech request functionality, a speech request indicator, a text messaging functionality, a file transfer functionality, and/or a whisper functionality. The speech request indicator optionally includes an indicator that a client does not have permission to speak, an indicator that a speech requesting client has been added to a voice queue, and/or an indicator that the speech requesting client has permission to speak.

15 The forum creation functionality optionally includes a forum name editor, an environment selector, an environment import functionality, and/or an environment customization functionality.

25 In accordance with another embodiment, of the instant invention, a method for providing at least one

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virtual room for communication to a plurality of users communicatable with a computer network is provided. The method includes the following sequential, non-sequential, or sequence-independent steps: The conference server determines whether all users in an available virtual room have selected respective graphical representations to be displayed in the virtual room. The conference server determines whether any of the plurality of users has issued a speech request. In real-time, the multi-point control unit server optionally duplicates and transmits aural input from a user corresponding to a respective speech request to remaining users.

The method further includes the following sequential, non-sequential, or sequence-independent steps. All speech requests are stored in a voice queue at the conference server. The conference server determines a speech request at an end of the voice queue. The duplicating step is dependent at least in part on the speech request determining step. Optionally, the multi-point control unit server mutes the remaining users during the duplicating step. One or more selected graphical representations are displayed in the virtual room.

Optionally, the method includes the following sequential, non-sequential, or sequence-independent steps. The multi-conference manager determines whether a new user has contacted it. The multi-conference manager displays one or more of the

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5 available virtual rooms, any user in each virtual
room, and/or any user in a virtual lobby to the
available virtual room are identified, for the new
user via the user's client interface. The multi-
conference manager determines whether the new user has
requested to invite another user in a new virtual
room. The conference server displays the new virtual
room. The conference server also displays one or more
graphical representations in the new virtual room via
10 the client's interface. Optionally, the displaying
step is updated at least when an existing user
requests to exit the new virtual room and/or when
another user enters the new virtual room. The
conference server optionally transfers the exiting
15 user to the virtual lobby.

The method also optionally includes the
conference server and/or the multi-point control unit
server providing users with asynchronous communication
and/or synchronous communication in the virtual lobby.
20 The asynchronous communication includes electronic
mail, message boards for voice and/or text messages,
and/or whiteboards. For example, the message boards
and/or whiteboards are user-specific, user group-
specific, and/or topic specific. By way of example,
25 a user-specific voice message board in the lobby 80
serves as an answering machine on the computer network
40. The synchronous communication includes real-time
aural chat sessions, and/or real-time text chat

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sessions. The virtual lobby may also include a whisper functionality described below.

5 The multi-conference manager determines whether the new user has requested to join another user in an available virtual room. The conference server displays the available virtual room, and one or more selected graphical representations in the available virtual room. Optionally, the displaying step is updated at least when an existing user requests to exit the available virtual room and/or when another user enters the available virtual room. Optionally, the exiting user is transferred to the virtual lobby.

10 In an alternative embodiment, the instant invention provides a system for providing at least one chat room for facilitating communication between a plurality of clients in a computer network. The system includes a graphical representation server communicatable and connectable with the computer network and managing avatars of the plurality of clients. The system also includes a queue server communicatable and connectable with the computer network and controlling at least one of a speech request queue determining at least in part an order of speaking by the plurality of clients, a text request queue determining at least in part an order of text chatting by the plurality of clients, and a file transfer queue determining at least in part an order of file transferring by the plurality of clients. The system further includes a streaming server

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communicatable and connectable with the computer network and streaming aural communications to the plurality based, at least in part, on the speaking order determined by the speech request queue.

5 In another embodiment, the instant invention includes a system for providing at least one chat room for facilitating communication between a plurality of clients in a computer network. The system includes a server communicatable and connectable with the computer network and managing avatars of the plurality of clients. The server controls a speech request queue determining at least in part an order of speaking by the plurality of clients, a text request queue determining at least in part an order of text chatting by the plurality of clients, and a file transfer queue determining at least in part an order of file transferring by the plurality of clients. The server streams aural communications to the plurality based, at least in part, on the speaking order determined by the speech request queue.

10 In another embodiment, the instant invention includes a method for providing one or more chat room for facilitating communication between a plurality of clients in a computer network. The method includes the following sequential, non-sequential, or sequence-independent steps. Avatars of the plurality of clients are managed, for example, by a conference server. A speech request queue determining at least in part an order of speaking by the plurality of

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clients, a text request queue determining at least in part an order of text chatting by the plurality of clients, and/or a file transfer queue determining at least in part an order of file transferring by the plurality of clients, are controlled, for example, by the conference server. Aural communications are streamed, for example, by a streaming server, to the plurality of clients based, at least in part, on the speaking order determined by the speech request queue.

There has thus been outlined, rather broadly, the more important features of the invention in order that the detailed description thereof that follows may be better understood, and in order that the present contribution to the art may be better appreciated. There are, of course, additional features of the invention that will be described hereinafter and which will form the subject matter of the claims appended hereto.

In this respect, before explaining at least one embodiment of the invention in detail, it is to be understood that the invention is not limited in its application to the details of construction and to the arrangements of the components set forth in the following description or illustrated in the drawings. The invention is capable of other embodiments and of being practiced and carried out in various ways. Also, it is to be understood that the phraseology and

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terminology employed herein are for the purpose of description and should not be regarded as limiting.

As such, those skilled in the art will appreciate that the conception, upon which this disclosure is based, may readily be utilized as a basis for the designing of other structures, methods and systems for carrying out the several purposes of the present invention. It is important, therefore, that the claims be regarded as including such equivalent constructions insofar as they do not depart from the spirit and scope of the present invention.

Further, the purpose of the foregoing abstract is to enable the U.S. Patent and Trademark Office and the public generally, and especially the scientists, engineers and practitioners in the art who are not familiar with patent or legal terms or phraseology, to determine quickly from a cursory inspection the nature and essence of the technical disclosure of the application. The abstract is neither intended to define the invention of the application, which is measured by the claims, nor is it intended to be limiting as to the scope of the invention in any way.

These together with other objects of the invention, along with the various features of novelty which characterize the invention, are pointed out with particularity in the claims annexed to and forming a

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part of this disclosure. For a better understanding of the invention, its operating advantages and the specific objects attained by its uses, reference should be had to the accompanying drawings and descriptive matter in which there is illustrated preferred embodiments of the invention.

NOTATIONS AND NOMENCLATURE

The detailed descriptions which follow may be presented in terms of program procedures executed on a computer or network of computers. These procedural descriptions and representations are the means used by those skilled in the art to most effectively convey the substance of their work to others skilled in the art.

A procedure is here, and generally, conceived to be a self-consistent sequence of steps leading to a desired result. These steps are those requiring physical manipulations of physical quantities. Usually, though not necessarily, these quantities take the form of electrical or magnetic signals capable of being stored, transferred, combined, compared and otherwise manipulated. It proves convenient at times, principally for reasons of common usage, to refer to these signals as bits, values, elements, symbols, characters, terms, numbers, or the like. It should be noted, however, that all of these and similar terms are to be associated with the appropriate physical

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quantities and are merely convenient labels applied to these quantities.

Further, the manipulations performed are often referred to in terms, such as adding or comparing, which are commonly associated with mental operations performed by a human operator. No such capability of a human operator is necessary, or desirable in most cases, in any of the operations described herein which form part of the present invention; the operations are machine operations. Useful machines for performing the operation of the present invention include general purpose digital computers or similar devices.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a schematic of a first embodiment of a system architecture consistent with the instant invention;

Fig. 2 is a schematic of a system architecture consistent with the instant invention;

Fig. 3 is a schematic of an alternative embodiment of a system architecture consistent with the instant invention;

Fig. 4 is a screen display consistent with the instant invention;

Fig. 5 is a screen display consistent with the instant invention;

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Fig. 6 is a screen display consistent with the instant invention;

Fig. 7 is a screen display consistent with the instant invention;

5 Fig. 8 is an illustrative embodiment of a computer and assorted peripherals;

Fig. 9 is an illustrative embodiment of internal computer architecture consistent with the instant invention;

10 Fig. 10 is an illustrative embodiment of a memory medium;

Fig. 11 is a flow chart showing an illustrative method of operation of the instant invention;

15 Fig. 12 is a flow chart showing an illustrative method of operation of the instant invention; and

Fig. 13 is a flow chart showing an illustrative method of operation of the instant invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

20 The instant invention includes a software application, such as a client/server application, for hosting multi-user environments incorporating real-time synchronous communication. By way of example, the client/server application includes a software
25 program suite. The synchronous communication includes standard aural and standard text-based communication. Optionally, the environments incorporate standard

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asynchronous communication including, for example, electronic mail ("e-mail") and data file transfer.

The environments include forums or virtual chat rooms, limited in theme only by a user's imagination.

5 The instant invention thus facilitates real-time voice conversations, in a round-table fashion, between users in forums, such as a music forum. By way of example, the users play, in real-time, portions of songs under discussion via respective microphones. In addition, or alternatively, the users optionally send to each other sample pieces of songs under discussion by transferring standard audio data files. Alternatively, for example, a forum includes a "distance learning" classroom setting having an instructor and students around the country and, indeed, around the world. As another example, a forum includes a conference panel discussion having panel members and conference attendees. By way of illustration, such a forum is optionally simulcast relative to a live panel discussion, wherein users would in effect stand in the shoes of any conference attendee waiting in line to use a standing microphone.

20 The breadth of applications for the instant system and/or method is readily appreciated. By way of example, in electronic commerce, whether it is selling cars to selling books or offering customer service, this system brings one closer to one's

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customers and puts a personal touch back in one's business. In sales, the instant system provides a stimulating shopping experience that will give customers the urge to buy within an interpersonal sales environment. The very nature of the present invention lends itself to offering top of the line customer service by enabling professionals to attend to individual and business customers on-line.

As to business procurement, this system increases the efficiency of one's operation by using up to date real-time interactive conferencing capabilities with one's suppliers. Relative to branding, the present invention is invaluable as a corporate image enhancer by establishing a user-friendly atmosphere where people can go to learn about products and optionally buy. The instant system facilitates tracking and marketing information using pre-market surveys with controlled database surveys in real-time.

As to healthcare, the instant invention provides an improved communication medium between health care providers and patients. By way of example, in field trials, patients felt at ease meeting with professional care givers in environments designed according to the instant invention. Relative to disease management, the present system improves compliance and thus outcomes for increased cost benefit.

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With respect to behavioral care, this system provides the facility for moderated group therapy and/or support groups that allows greater patient anonymity and privacy than otherwise possible. Again, this improves compliance and increases the likelihood of successful outcomes. As to doctor education, the present invention provides a convenient medium for managed care professionals, for example, to be kept up to date, in their homes and/or in their offices. Regarding emergency hotlines, the instant invention facilitates a hotline providing real-time answers. The system also, for example, facilitates outpatient support for long term follow-up from chronic care, as well as, orientation and/or follow-up programs for surgical procedures and post-operative recovery programs.

Fig. 1 shows, by way of example, a system level schematic of the instant invention in a sample context. Specifically, at least one of the multiple conference servers 30, 32, 34 is communicatably connected to a standard computer network 40. Non-limiting examples of acceptable computer networks include local area networks, wide area networks, global networks, intranets and/or internets, such as the Internet. Users communicate with one or more of the multiple conference servers 30, 32, 34 via respective clients 50, 52, 54 having access to the

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computer network 40. Access is optionally through a standard wireline connection to the computer network 40. Alternatively, the access is through a standard wireless connection to the computer network 40.

5 The clients 50, 52, 54, by way of example, include standard computers 900, such as shown in Fig. 8, having standard aural communication equipment and/or software. Such standard equipment include, for example, a standard headset 940 having a set of
10 standard headphones 942 with an attached microphone 944 that extends to the front of a user's face. Advantageously, a headset provides hands free operation without problems of feedback and/or echoes. Alternatively, a standard monitor-mounted or free-
15 standing microphone and standard headphones are also acceptable aural communication equipment. Optionally, speakers are used instead of headphones, but may suffer from echoes more so than standard headphones.

20 Figs. 1-3 is an illustrative schematic of the architecture of the instant invention in context. Each multiple conference server 30, 32, 34 includes a conference server 60, a multi-point control unit server 62, an audio/visual communications server 64.
25 Conference server 60 communicates with a multi-conference manager 66. By way of example, the multi-conference manager 66 resides on one of the multiple

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conference servers 30, 32, 34 or on the conference server 60. Alternatively, the multi-conference manager 66 is independent of the multiple conference servers 30, 32, 34 and the conference server 60. Optionally, all three latter servers 60, 62, 64 are embodied in a single standard server or are embodied in a plurality of servers in a standard distributed network.

Optionally, as shown by way of illustration in Fig. 3, the system further includes a master server 70 controlling access by potential clients to the multiple conference servers 30, 32, 34, and having a connection to or being communicatable with the Internet or other computer network. The master server 70, for example, includes the multi-conference server 66. Alternatively, the multi-conference server is independent of the master server 70 and the multiple conference servers 30, 32, 34.

The initial connection of a client to the instant invention includes connecting to the multi-conference manager 66. This is identified generally by arrows 1 and 2 in Fig. 2. As indicated generally by arrows 3 and 4 in Fig. 2, the multi-conference manager 66 responds to the client 52 by optionally displaying a virtual lobby 80, as shown by way of example in Fig. 4, and/or by identifying, for example, all users on-line, all users in each forum, and all users in a

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lobby. The lobby 80, for example, as illustrated in Fig. 4, is discussed hereinbelow in further detail.

Upon user-request, the multi-conference manager 66 routes the client 52 or user to an available desired voice chat room. That is, the multi-conference manager 66 routes the client 52 to an available conference server 60, as indicated generally by arrow 6 of Fig. 3. The client 52 subsequently connects to the conference server 60 to which it was routed, as indicated generally by arrow 7. Optionally, as indicated by arrow 8 the client 52 sends an occasional "keep alive" indication to the multi-conference manager 66. For example, the "keep alive" indication to the multi-conference manager 66 ensures continual connection of the respective client to the manager, when there is no other input on the part of the client.

The client 52 connects to the an audio/visual communications server 64. By way of example, the communications server 64 supports standard applications using a standard communications protocol for transmitting audio and/or visual data over a computer network 40. An example of such a communications protocol is the Open Source H.323 protocol stack, originally developed by Equivalence Pty Ltd. of Australia. H.323 standards are found, by way of example, at

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http://www.openh323.org/standards.html, and are incorporated by reference. Examples of standard applications using the H.323 protocol include NetMeeting by Microsoft Corporation and Proshare® by Intel Corporation of Santa Clara, CA. Alternatively, an example of an H.323 endpoint is "voxilla," which is a command line application for initiating, or accepting, an H.323 connection.

By way of illustration, the client 50 connects to a standard "voxilla" server 64, as indicated by arrow 10 via network 40. "Voxilla" server 64 acknowledges or completes the connection as illustrated by arrow 11, which generally represents the H.323 connection. The "voxilla" server 64 notifies the conference server 60 of the establishment of the H.323 connection, and/or sends client connection information to the conference server 60, as indicated generally by arrow 13. The conference server 60 optionally notifies the client 52 of the established connection. Once this connection is established, the client 52 sends, for example, aural data to the multi-point control unit server 62, as indicated generally by arrows 15 and 16. The control unit server 62 duplicates the data and forwards the same to other clients, for example, clients 50, 54 in the lobby 80 or a voice chat room, as indicated generally by arrows 17, 18 and 19. Optionally, the conference server 60 sends occasional

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"keep alive" indications to the multi-conference manager 66, as indicated by arrow 20. For example, the "keep alive" indication to the multi-conference manager 66 maintains an open voice chat room in the absence of activity by any of the users in the room.

The instant invention includes a graphical interface application for users, such as shown, by way of example, in a first client interface 90 of Figs. 4, 5, 6, and, in a second client interface 92 of Fig. 7. Each client interface 90, 92, for example, includes at least one graphical main window 94. For example, the client interface 90, 92 includes a stand-alone application. Alternatively, the client interface 90, 92 includes a helper application or a plug-in application for a standard web browser. Advantageously, the client interface 90, 92, embodied as a plug-in application, is recognized automatically by the web browser and its function is integrated into a main HTML file that is being presented.

Optionally, multiple graphical main windows are opened simultaneously so as to permit participation in multiple forums simultaneously. In such a use or embodiment, the forum in the top graphical main window is active, while the forums in other graphical main windows optionally remain in the background. That is, the user is able to communicate with participants in the forum in the top graphical main window. To participate in one of the other forums, the user, for

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example, selects the graphical main window associated with the desired forum. By way of illustration, the lobby 80 is optionally displayed in a graphical main window in the background, while a desired forum is optionally displayed in the graphical main window in the foreground. In such a manner, users optionally monitor newcomers to the lobby 80. The specific location of the active window is optionally user-configurable. In addition, multiple windows may be substantially simultaneously or simultaneously active.

As shown in Figs. 4, 5, 6, and 7, the graphical client interface 90, 92 optionally includes selectable menus, graphical windows, buttons, or tabs, such as a configuration menu 100, an on-line tab 110, a communications tab 120, a sound tab 130, an avatars tab 140, and/or a forum creation tab 150, all described hereinbelow. Selecting, or clicking on, each tab with a standard input device, for example, opens a standard pop-up window or standard pull-out window. Standard input devices for selecting the tabs include, for example, a standard keyboard 910, a standard mouse 912, and/or a standard pointer.

Optionally, the configuration menu 100 includes a server address functionality. For example, the server address functionality enables user input of the server Internet Protocol ("IP") address. Optionally, selecting the server address functionality in the configuration menu 100 effects, for example, a

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standard pop-up dialog box or a standard pull-out window. The dialog box, for example, includes a standard edit box for entering the conference server IP address. The edit box optionally includes a save functionality for saving the server IP address locally and/or a cancel functionality for canceling further actions to connect to the conference server 60.

The communications tab 120 optionally includes a request to talk functionality 122, represented, for instance, as a virtual button. For example, a user selects the request to talk functionality 122 to place a speech request on a voice queue for the forum in the conference server 60. The voice queue is optionally a first-in-first-out queue. That is, speakers are selected to speak in the order of their speech requests in the voice queue. Other rule-based queues may optionally or alternatively be used.

The communications tab 120 optionally includes a cancel speech functionality 124, represented, for instance, by a virtual button. The cancel functionality 124, for example, enables a speaker to relinquish her right to speak upon her concluding remarks. Optionally, the cancel functionality 124 enables a user who has a speech request pending on the voice queue to cancel or delete her speech request.

Alternatively, or in addition to, the cancel speech functionality 124, the communications tab 120

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includes a timer. The timer provides a user with a finite amount of time to begin speaking upon reaching the top of the voice queue. If the user fails to speak prior to the timer indicating an expiration of an allotted time for response, the user's permission to speak is revoked, and the next speech request in the voice queue is honored.

The communications tab 120 optionally includes a speech request indicator 126. For example, the speech request indicator 126 includes a traffic light. A red light indicates that a user has no permission to speak. By way of example, if a user, who has not placed a speech request on the voice queue, attempts to speak, such as, by depressing the space bar, the speech request indicator displays a red light. A yellow light indicates that a user is in the voice queue and has permission to speak when her speech request reaches the end or the top of the voice queue. A green light indicates a user who has permission to speak in real-time to the co-users in the forum. Other light indicators may alternatively be used.

Optionally, the communications tab 120 including the speech request indicator 126 cooperates with, for example, one or more keyboard entries. For instance, a user desiring to speak depresses the space bar or other key on a standard keyboard 910. The depressing of the space bar, for example, places the user on the

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voice queue. If the user releases the space bar, the user is optionally automatically removed from the voice queue. Once the user is speaking, releasing the space bar may automatically communicate to the conference server 60 that the next speech request in the voice queue is to be honored. Other keyboard entry configurations may also be used.

The communications tab 120 optionally includes a text messaging functionality 128 represented, for instance, as a virtual button. For example, a user selects the text messaging functionality 128 to place a text message request on a text queue for the forum in the conference server 60. The text queue is optionally a first-in-first-out queue. That is, those users intending to type a message to other users are selected to input a text message in the order of their text message requests in the text queue. Other rule-based queues may alternatively be used.

The communications tab 120 optionally includes a text messaging request indicator. For example, the text messaging request indicator includes a traffic light. A red light indicates that a user has no permission to type. A yellow light indicates that a user is in the text queue and has permission to type when her text messaging request reaches the end or the top of text queue. A green light indicates a user who

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has permission to type. Other light indicators may alternatively be used.

The communications tab 120 optionally includes a cancel text functionality, represented, for instance, by a virtual button. The cancel functionality, for example, enables a user to relinquish her right to type upon her concluding remarks. Optionally, the cancel functionality enables a user who has a text messaging request pending on the text queue to cancel or delete her text message request.

The communications tab 120 optionally includes a standard edit box 125 or standard editor for typing a text message. Such an embodiment optionally includes a send text functionality 129 for sending the typed text in real-time to the co-users in the forum. Optionally, the edit box 128 is scrollable to view a number of older texts. Within practical constraints, any number of saved texts are acceptable. For example, the last ten text messages are saved, and the remainder discarded.

The communications tab 120 optionally includes a data file transfer functionality 134 represented, for instance, as a virtual button. For example, a user selects the data file transfer functionality 134 to place a data file transfer request, in a first embodiment, on a data file queue for the forum in the conference server. The data file queue is optionally

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a first-in-first-out queue. That is, those users intending to send a message to other users are selected to send a file in the order of their data file transfer requests in the data file queue. Other rule-based queues may be alternatively used.

The communications tab 120 optionally includes a file transfer request indicator. For example, the file transfer request indicator includes a traffic light. A red light indicates that a user has no permission to send a data file. A yellow light indicates that a user is in the data file queue and has permission to send a data file when her data file transfer request reaches the end or the top of data file queue. A green light indicates a user who has permission to send a data file. Other light indicators may alternatively be used.

In another embodiment of the data file queue, the queue includes the data files themselves, not user requests for sending them. In such an embodiment, once a data file has reached an end or a top of the file transfer queue, it is sent to the co-users in the forum.

The communications tab 120 optionally includes a cancel file transfer functionality, represented, for instance, by a virtual button. Optionally, the cancel file transfer functionality enables a user who has a

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file transfer request pending on the data file queue to cancel or delete her data file transfer request.

The communications tab 120 optionally includes a whisper functionality 155, as shown in Fig. 7, for example, as described hereinbelow, with respect to Fig. 12. The whisper functionality 155 is represented, for instance, as a virtual button.

Optionally, the on-line tab 110 identifies all users presently on-line including, for example, their name, alphanumeric identification code, and/or location, e.g., lobby, sports fan voice chat room, or senior citizens voice chat room, and the like. The graphical interface may also include one or more lists of user-selected co-users. For example, as virtual communities grow in the environments provided by the instant invention, we have recognized that it would be desirable to search quickly and easily the communities for known fellow users. A list of co-users is optionally pre-configured as a "My Friends" feature, identifying the co-user's name, identification code, and location. The on-line tab includes at least one such list of co-users. Optionally, or in addition, such lists of co-users are user-definable. For example, a user optionally defines a "My Business Contacts" list or a "My Family" list, via a "New List" functionality. Then, the client optionally defines co-users for such lists via an add new co-user

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functionality, identifying a name, an identification code, a username, and/or an e-mail address. Optionally, on-line tab also includes a delete co-user functionality to cancel or delete co-users from defined lists.

Optionally, the on-line tab 110 includes room information linked to the names of the rooms listed on the on-line tab 110. For example, selecting, or clicking on a name yields, for instance, a pop-up or pull-out window identifying the number of people in the room, whether the room is full, and/or names of all users in the room. The on-line tab includes an optional sort or search functionality so as to search the lobby and across one or more, and preferably all, forums for one or more users by name, identification code, and/or e-mail address. Of course, the present invention also provides users the ability to conduct a private or anonymous conference.

The on-line tab 110 optionally includes updateable and/or downloadable standard databases such as created using Access by Microsoft Corporation. That is, as virtual communities grow according to this system, scrolling through a pull-out window, for example, becomes unwieldy. Accordingly, the databases include conference database information including forum names, names of participants, maximum attendee limits, and/or seat assignments.

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Optionally, the on-line tab 110 includes one or more of the following functionalities. For example, the main window 92 optionally includes a show list functionality 112, and the on-line tab 110 optionally includes a hide functionality 114. The show list functionality 112 and the hide functionality 114 are toggled in a standard manner. That is, if the show list functionality 112 is selected, the on-line tab 110 is displayed, whereas if the hide functionality 114 is selected the on-line tab 110 is collapsed or removed.

For example, the on-line tab 110 includes an invite functionality 116, represented by a virtual button for inviting another user or client to a new forum. By way of illustration, a user selects other clients from one or more of the above-mentioned lists, or selects one their avatars with one of the standard input devices, such as a mouse. The user selects the invite functionality 116, which sends an invitation to each selected client to join the sending user or client in a new forum. The invitation optionally includes a voice and/or text invitation message, along with a functionality to accept or decline. If the receiving client chooses to accept the invitation, the client is transferred to the new forum. Completion of the transfer is optionally indicated by the display in the transferred graphical main window 94 of the

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graphical representation of the client in the new forum and/or by the display in the graphical main window 94 of the virtual environment of the new forum. Otherwise, if the user declines the invitation, she optionally sends an explanatory message for declining the invitation.

Optionally, the on-line tab 110 includes a join functionality 118, represented by a virtual button for joining other clients in an available forum. Selecting this functionality transfers the user to the desired forum. By way of example, selection of the functionality sends to the owner or moderator of the voice chat room a request message to join the conversation in the room. Completion of the transfer is optionally indicated by the display in the transferred graphical main window of the graphical representation of the user in the desired forum and/or by the display in the graphical main window 94 of the virtual environment of the desired forum. Otherwise, if the owner or moderator declines the request to join, she optionally sends an explanatory message for declining the request.

Optionally, the join functionality 118 includes a permission request. Optionally, the permission request includes a voice and/or text message. In such an embodiment, users in the room to be joined determine whether a new user is permitted to join

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them. Accordingly, an affirmative or negative response is returned to the user wishing to join the room.

5 The on-line tab 118 optionally includes a listen functionality to permit users to listen to, but not participate in, conversations in full chat rooms. Optionally, the listen functionality includes a permission request. Optionally, the permission request includes a voice and/or text message. In such an embodiment, users in the room determine whether a new user is permitted to listen to their conversation. Accordingly, an affirmative or negative response is returned to the user wishing to listen.

10 The invite functionality 116 and/or join functionality 118 optionally include standard dialog boxes for synchronous or asynchronous communication between users prior to entering a forum.

15 The invite functionality 116 and/or the join functionality 118 are optionally disabled until a user's name or identification code is selected from one of the above-mentioned lists. Optionally, the invite functionality 116 is enabled when a name is selected, for example, from the lobby 80. Optionally, the join functionality 118 is enabled when a room or
20 a name of a user in a voice chat room is selected.

25 Sound tab 130, represented, for instance, as a pop-up window, includes one or more of the following

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optional features for adjusting one or more sound settings on the client's computer. The sound tab includes standard speaker and/or microphone meters showing activity when the user is listening and speaking, respectively. The sound tab 130 includes standard speaker volume and microphone sensitivity selectors. For example, the selectors include virtual slides and/or virtual dials.

For the purposes of this invention, an avatar includes any two or three dimensional image that represents a user's presence in a voice chat session and/or lobby of the instant system. Optionally, the avatar tab 140 provides a user with selectable non-configurable avatars and/or selectable customizable avatars. Optionally, the non-configurable avatars are programmed to include graphical gestures consistent with the "personas" of the avatars. Alternatively, each customizable avatar includes a face that a user selects by inserting or selecting a desired standard bit map or a standard compressed graphic image. By way of illustration, the bit map optionally includes a user-designed face drawn on a standard computer drawing application or a standard video image captured using a standard video camera. Alternatively, each customizable avatar includes a face, which includes a live video stream, for example, from a standard web cam. In this manner, for example,

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the face of the user is provided by the web cam to be seen on the client interface.

Forum creation tab 150 includes, for example, a standard pull-out window or a standard pop-up dialog box. The forum creation tab 150 also includes, for example, a standard edit box or forum name editor for inputting a name of a new forum or voice chat room. The forum creation tab 150 also optionally includes an environment selector for enabling a user to determine the appearance of the new forum. For example, the environment selector includes selectable default environments that are free of a theme, such as a conference room having a large table surrounded by chairs, or a cityscape. In addition to, or alternatively, the selectable default environments include thematic environments such as a shop, a sports bar or a lecture hall or a hospital ward. The forum creation tab 150 optionally includes an environment import functionality for importing from off-line a graphic image optionally not available among the default environments, and/or an environment customization functionality including a standard graphics program for customizing one or more of the default environments.

The graphical main window 94 optionally includes standard features that need not be linked to the above-mentioned tabs. For example, a graphical representation of a user or client in the graphical

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main window 94 includes user or client information. For instance, dragging a virtual pointer, such as by using a mouse, to a graphical representation yields a text window including the user information, e.g., a name, an user identification code, and/or an e-mail address. Alternatively, clicking on the avatar using, for example, the right button or the left button of a mouse, yields the same or similar text window. Optionally, clicking on the avatar using, for example, the right button or the left button of a mouse, yields a menu of functions available for direct interaction with the user represented by the avatar. Such direct interaction, for example, includes sending a text or voice message, sending a data file, sending an e-mail, and/or adding the user to a desired list of co-users, such as a "My Friends" list.

Optionally, the system includes a moderator interface application, which, for example, all of the same features discussed above relative to the client interface. Accordingly, only those features distinct to the moderator interface application are discussed. The moderator application includes an optional muting functionality. The muting functionality enables the moderator, for example, to cut-off a speaker unwilling to stop speaking, thereby converting an intended chat into a monologue. The moderator application may include, in its graphical main window, a display of

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the voice queue. The display includes selectable speech requests so that the user having the moderator application is able to select speakers out of turn from the order in the voice queue.

5 For completeness, Fig. 8 is an illustration of a main central processing unit for implementing the computer processing in accordance with a computer implemented embodiment of the present invention. The procedures described herein are presented in terms of
10 program procedures executed on, for example, a computer or network of computers.

Viewed externally in Fig. 8, a computer system designated by reference numeral 900 has a computer 902 having disk drives 904 and 906. Disk drive
15 indications 904 and 906 are merely symbolic of a number of disk drives which might be accommodated by the computer system. Typically, these would include a floppy disk drive 904, a hard disk drive (not shown externally) and a CD ROM indicated by slot 906. The
20 number and type of drives varies, typically with different computer configurations. Disk drives 904 and 906 are in fact optional, and for space considerations, are easily omitted from the computer system used in conjunction with the production
25 process/apparatus described herein.

The computer system also has an optional display 908 upon which information is displayed. In some situations, a keyboard 910 and a mouse 902 are provided as input devices to interface with the

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central processing unit 902. Then again, for enhanced portability, the keyboard 910 is either a limited function keyboard or omitted in its entirety. In addition, mouse 912 optionally is a touch pad control device, or a track ball device, or even omitted in its entirety as well. In addition, the computer system also optionally includes at least one infrared transmitter and/or infrared received for either transmitting and/or receiving infrared signals, as described below.

Fig. 9 illustrates a block diagram of the internal hardware of the computer system 900 of Fig. 8. A bus 914 serves as the main information highway interconnecting the other components of the computer system 900. CPU 916 is the central processing unit of the system, performing calculations and logic operations required to execute a program. Read only memory (ROM) 918 and random access memory (RAM) 920 constitute the main memory of the computer. Disk controller 922 interfaces one or more disk drives to the system bus 914. These disk drives are, for example, floppy disk drives such as 904, or CD ROM or DVD (digital video disks) drive such as 906, or internal or external hard drives 924. As indicated previously, these various disk drives and disk controllers are optional devices.

A display interface 926 interfaces display 908 and permits information from the bus 914 to be displayed on the display 908. Again as indicated,

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display 908 is also an optional accessory. For example, display 908 could be substituted or omitted. Communications with external devices, for example, the components of the apparatus described herein, occurs utilizing communication port 928. For example, optical fibers and/or electrical cables and/or conductors and/or optical communication (e.g., infrared, and the like) and/or wireless communication (e.g., radio frequency (RF), and the like) can be used as the transport medium between the external devices and communication port 928. Peripheral interface 930 interfaces the keyboard 910 and the mouse 912, permitting input data to be transmitted to the bus 914. In addition to the standard components of the computer, the computer also optionally includes an infrared transmitter and/or infrared receiver. Infrared transmitters are optionally utilized when the computer system is used in conjunction with one or more of the processing components/stations that transmits/receives data via infrared signal transmission. Instead of utilizing an infrared transmitter or infrared receiver, the computer system optionally uses a low power radio transmitter and/or a low power radio receiver. The low power radio transmitter transmits the signal for reception by components of the production process, and receives signals from the components via the low power radio receiver. The low power radio transmitter and/or receiver are standard devices in industry.

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Fig. 10 is an illustration of an exemplary memory medium 932 which can be used with disk drives illustrated in Figs. 9 and 10. Typically, memory media such as floppy disks, or a CD ROM, or a digital video disk will contain, for example, a multi-byte locale for a single byte language and the program information for controlling the computer to enable the computer to perform the functions described herein. Alternatively, ROM 918 and/or RAM 920 illustrated in Figs. 9 and 10 can also be used to store the program information that is used to instruct the central processing unit 916 to perform the operations associated with the production process.

Although computer system 900 is illustrated having a single processor, a single hard disk drive and a single local memory, the system 900 is optionally suitably equipped with any multitude or combination of processors or storage devices. Computer system 900 is, in point of fact, able to be replaced by, or combined with, any suitable processing system operative in accordance with the principles of the present invention, including sophisticated calculators, and hand-held, laptop/notebook, mini, mainframe and super computers, as well as processing system network combinations of the same.

Conventional processing system architecture is more fully discussed in Computer Organization and Architecture, by William Stallings, MacMillan Publishing Co. (3rd ed. 1993); conventional processing

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system network design is more fully discussed in Data Network Design, by Darren L. Spohn, McGraw-Hill, Inc. (1993), and conventional data communications is more fully discussed in Data Communications Principles, by R.D. Gitlin, J.F. Hayes and S.B. Weinstein, Plenum Press (1992) and in The Irwin Handbook of Telecommunications, by James Harry Green, Irwin Professional Publishing (2nd ed. 1992). Each of the foregoing publications is incorporated herein by reference. Alternatively, the hardware configuration is, for example, arranged according to the multiple instruction multiple data (MIMD) multiprocessor format for additional computing efficiency. The details of this form of computer architecture are disclosed in greater detail in, for example, U.S. Patent No. 5,163,131; Boxer, A., Where Buses Cannot Go, IEEE Spectrum, February 1995, pp. 41-45; and Barroso, L.A. et al., RPM: A Rapid Prototyping Engine for Multiprocessor Systems, IEEE Computer February 1995, pp. 26-34, all of which are incorporated herein by reference.

In alternate preferred embodiments, the above-identified processor, and, in particular, CPU 916, may be replaced by or combined with any other suitable processing circuits, including programmable logic devices, such as PALs (programmable array logic) and PLAs (programmable logic arrays). DSPs (digital signal processors), FPGAs (field programmable gate arrays), ASICs (application specific integrated

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circuits), VLSIs (very large scale integrated circuits) or the like.

By way of illustration, computer 900 includes a standard personal computer having a Intel Pentium processor for running Microsoft Windows 95/98/NT and Microsoft NetMeeting 2.1 or greater, and having 16 megabytes of RAM. The illustrative personal computer 900 further includes a standard 28,800 baud modem 946, and a standard microphone 944 and speakers 942, for example, embodied as a headset 940 connected to a standard sound card 946, as illustrated in Fig 9.

A non-limiting, illustrative example of operation of the instant invention is provided as follows, referring to Fig. 11. In step S100, the multi-conference manager 66 determines or detects whether the user has contacted the conference manager to participate in a conference and/or to access the lobby 80 or waiting room area. If yes, in step S110, the multi-conference manager 66 identifies all users on-line in each forum or voice chat room, updates which users have left various forums, and/or identifies which users are in the lobby 80. In step S120, the multi-conference manager 66 determines whether the user wishes to invite another user to a new room to chat via, for example, a request input from the user. If yes, optionally, the multi-conference manager 66 determines whether a new voice chat room can be opened

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on the conference server 60. If yes, in step S130, the multi-conference manager 66 determines whether all of the users in the new room have selected respective avatars. If yes, in step S140, the conference server 60 displays at least one, and optionally all, of the avatars of the users in the new room. Optionally, also in step S140, a voice chat room owner or moderator inputs a name for the voice chat room. In step S150, the conference server 60 determines whether any user has requested permission to speak. If yes, in step S160, the conference server 60 places the user speech request on a voice queue at the conference server.

In step S170, the conference server 60 determines whether the user's speech request has reached the top of the voice queue. If yes, in step S180, the user is authorized to speak until finished, and optionally the remaining co-users are muted by the multi-point control unit server 62. The user, for example, speaks into his microphone. The aural input is transmitted via the computer network to the multi-point control unit server 62, which in turn optionally duplicates and transmits the aural input via the computer network to the clients 50, 52, and 54. In step S190, the conference server also determines whether the user wishes to exit the room. If no, step S140 is repeated. Otherwise, in step S195, the conference

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server 60 the user to the lobby 80, i.e., step S110, or optionally exited from the system.

5 In step S120, if the user does not wish to invite another user to a new room to chat, the multi-conference manager 66 determines whether the user wishes to join other users already in a voice chat room in step S200. Optionally, the multi-conference manager 66 determines whether the maximum number of users for a desired voice chat room has been yet to be reached. If yes, in step S210, the conference server 10 60 determines whether the user has selected an avatar. If yes, in step S220, the conference server 60 displays at least one, and preferably all, of the avatars in the room are displayed. In step S230, the conference server 60 determines whether any user has requested permission to speak. If yes, in step S240, the conference server places the user speech request on a voice queue at the conference server.

15 In step S250, the conference server 60 determines whether the user's speech request has reached the top of the voice queue. If yes, in step S260, the user is authorized to speak until finished, and optionally the remaining co-users are muted by the multi-point control unit server 62. In step S270, the conference server 20 60 determines whether the user wishes to exit the room. If no, step S220 is repeated. Otherwise, in step S280, the conference server returns the user

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to the lobby 80, i.e., step S110, or is optionally exited out from the system.

In a consistent embodiment, a non-limiting, illustrative example of operation of the instant invention is provided as follows, referring to Fig. 12 for the whispering feature. In step S300, the conference server 60 displays at least one, and preferably all, of the avatars of the users in a first voice chat room. In step S310, the conference server determines whether a user has requested to engage in whispering with another user. If yes, in step S320, the conference server 60 generates a second room within the first room, and optionally displays at least one of the avatars of the users who intend to whisper. Alternatively, other graphical means may be used to indicate the whispering modes. For example, the conference server may indicate the users not engaging in the whispering by shading their avatars. In step S330, the users in the first room are optionally muted by the multi-point control unit server 62 or limited to text chatting, except for those in the second room. In step S340, the conference server 60 determines whether any user in the second room has requested permission to speak. If yes, in step S350, the conference server 60 places the user's speech request on a voice queue unique to the

-58-

second room and independent of the voice queue of the first room.

5 In step S360, the conference server determines whether the user's speech request is at the top of the voice queue for the second room. If yes, in step S370, the user at the top of the voice queue is permitted to speak until finished, and the remaining users in the second room are optionally muted by the multi-point control unit server 62. As explained above, the control unit server 62 optionally duplicates and forwards any aural input of the speaking user via the computer network to the remaining clients and/or those clients waiting to speak. In step S380, the conference server 60 determines whether the user wishes to exit the second room. If yes, the conference server returns the user to the first room, i.e., to step S300. Otherwise, the method returns to step S340.

10 In a consistent embodiment, a non-limiting, illustrative example of operation of the instant invention is provided as follows, referring to Fig. 13 for the communications tab feature. This method is presented from the perspective of the client interface 90, 92. In step S400, the client interface determines whether the user has selected the communications tab 120. In step S410, when the communications tab 120 is opened or selected by the user, the communications tab

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in the client interface 90, 92 displays a red light indicator. In step S420, the client interface determines whether the user has requested a request to talk functionality 122. In step S430, the client interface 90, 92 determines whether the user's speech request has reached the top of the voice queue. If no, in step S440, the client interface 90, 92 displays a yellow light indicator in the communications tab 120. If yes, in step S450, the client interface 90, 92 displays a green light indicator in the communications tab 120. At this point, the user speaks through the microphone 944 and is heard in real-time, or substantially contemporaneously, by users in the lobby where his avatar is located and/or the voice chat room where his avatar is located. In step S460, the client interface determines whether the user selected the cancel speech request functionality 124 at the conclusion of his remarks. If yes, operation continues to step S410.

The many features and advantages of the invention are apparent from the detailed specification, and thus, it is intended by the appended claims to cover all such features and advantages of the invention which fall within the true spirit and scope of the invention. Further, since numerous modifications and variations will readily occur to those skilled in the art, it is not desired to limit the invention to the

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exact construction and operation illustrated and described, and accordingly, all suitable modifications and equivalents may be resorted to, falling within the scope of the invention.

5

What is claimed is:

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1. A system for providing at least one forum facilitating communication between a plurality of clients in a computer network environment; said system comprising:

5 a conference server communicatable and connectable with the computer network hosting at least one forum, and managing graphical representations of a first one of the plurality of clients in the at least one forum; and

10 a multi-point control unit server communicatable and connectable with the computer network transmitting voice communication in real-time from a second one of the plurality of clients to at least one of the first one of the plurality of clients and a third one of the plurality of clients in the at least one forum.

15 2. The system according to claim 1, further comprising a data communications server communicatable with the computer network for negotiation of an
20 initial connection between at least one of the plurality of clients, and said conference server and said control unit server.

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3. The system according to claim 2, further comprising a multi-conference manager communicatable with the computer network for routing the at least one of the plurality of clients to the at least one forum.

5

4. The system according to claim 3, wherein said conference server, said multi-point control unit server, said data communications server, and said multi-conference manager comprise at least one multiple conference server.

10

5. The system according to claim 3, wherein said multi-conference manager provides, upon client request, at least one of asynchronous communication and synchronous communication to the at least one of the plurality of clients prior to entering the at least one forum.

15

6. The system according to claim 5, wherein said multi-conference manager provides, upon client request, a new forum.

20

7. The system according to claim 1, wherein said conference server maintains a real-time voice queue for each forum, and said multi-part control unit

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server manages the voice communication based on a client speech request order on said voice queue.

8. The system according to claim 1, wherein said conference server maintains a real-time text queue and transmits text communication in addition to transmitting the voice communication based on a client text transfer request order on said text queue from a text sending client to at least one text receiving client.

9. The system according to claim 1, wherein said conference server maintains a data file queue and transmits at least one data file based on a client text transfer request order on said data file queue from a data file sending client to at least one data file receiving client.

10. The system according to claim 7, wherein the client speech request order is based at least partially on a hierarchy of classes of clients.

11. The system according to claim 10, wherein the classes of clients include a participant class of clients and a moderator class of clients which outranks the participant class.

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12. The system according to claim 11, wherein a client in the moderator class is authorized to determine the client speech request order.

5 13. The system according to claim 10, wherein the classes of clients include a participant class of clients and one of an expert class of clients and a panel member class of clients, both of which outrank the participant class.

10 14. The system according to claim 1, wherein each forum includes a whisper functionality, upon client request, for providing private communication relative to any user not engaging the whisper functionality.

15 15. The system according to claim 4, wherein said at least one multiple conference server includes a plurality of multiple conference servers, and said
20 system further comprises a master server controlling access by potential clients to said plurality of multiple conference servers.

25 16. The system according to claim 1, wherein the computer network includes at least one of an intranet and the Internet.

17. The system according to claim 2, wherein the data communications server includes a voxilla server.

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18. The system according to claim 1, wherein the graphical representations of the clients include avatars of the clients.

5 19. The system according to claim 5,
wherein the asynchronous communication includes at least one of electronic mail, message boards for at least one of voice messages and text messages, and whiteboards, and

10 wherein the synchronous communication includes at least one of real-time aural chat sessions and real-time text chat sessions.

15 20. The system according to claim 19, wherein at least one of said message boards and said whiteboards are user-specific, user group-specific, and topic-specific.

20 21. The system according to claim 1, wherein the control unit server supports at least one of streaming sound and streaming data.

25 22. The system according to claim 1, wherein each of the plurality of clients includes a client interface.

23. The system according to claim 22, wherein said client interface includes a graphical main window

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for displaying at least one of the graphical representations of clients.

24. The system according to claim 23, wherein
5 the client interface includes at least one of a sound control menu for adjusting at least one sound setting on the client, an avatar selection menu, an on-line client window for identifying on-line clients, a communications window, and a forum creation functionality.
10

25. The system according to claim 24, wherein
said sound control menu includes at least one of a speaker meter, a speaker volume selector, a microphone sensitivity meter, and a microphone sensitivity selector.
15

26. The system according to claim 24, wherein
said avatar selection menu displays a plurality of selectable avatars.
20

27. The system according to claim 26, wherein
said avatar selection menu includes at least one of an avatar import functionality and an avatar customization functionality.
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28. The system according to claim 24, wherein said on-line client window includes at least one of an invite functionality for inviting another client to a new forum, and a join forum functionality for joining other clients in an available forum.

29. The system according to claim 24, wherein said communications window includes at least one of a speech request functionality, a cancel speech request functionality, a speech request indicator, a text messaging functionality, a file transfer functionality, and a whisper functionality.

30. The system according to claim 29, wherein said speech request indicator includes at least one of an indicator that a client does not have permission to speak, an indicator that a speech requesting client has been added to a voice queue, and an indicator that the speech requesting client has permission to speak.

31. The system according to claim 24, wherein said forum creation functionality includes at least one of a forum name editor, an environment selector, an environment import functionality, and an environment customization functionality.

32. A method for providing at least one virtual room for communication to a plurality of users

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communicatable with a computer network, said method comprising:

5 (a) determining whether all users in an available virtual room have selected respective graphical representations to be displayed in the virtual room;

(b) determining whether any of the plurality of users has issued a speech request; and

10 (c) duplicating and transmitting, in real-time, aural input from a user corresponding to a respective speech request to remaining users.

33. The method according to claim 32, further comprising:

15 storing all speech requests in a voice queue;

determining a speech request at an end of the voice queue; and

wherein said duplicating step is dependent at least in part on the speech request determining step.

20 34. The method according to claim 32, further comprising:

muting the remaining users during said duplicating step.

25 35. The method according to claim 32, further comprising:

displaying at least one selected graphical representation in the virtual room.

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36. The method according to claim 32, further comprising:

determining whether a new user has contacted a multi-conference manager; and

5 identifying, for the new user, at least one of all available virtual rooms, any users in each virtual room, and any users in a virtual lobby to the available virtual room.

10 37. The method according to claim 36, further comprising:

determining whether the new user has requested to join at least one other user in a new virtual room;

displaying the new virtual room; and

15 displaying at least one selected graphical representation in the new virtual room.

38. The method according to claim 37, further comprising:

20 updating said displaying step at least when one of an existing user requests to exit the new virtual room and another user enters the new virtual room.

39. The method according to claim 38, further comprising:

25 transferring the exiting user to the virtual lobby.

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40. The method according to claim 36, further comprising:

providing users with at least one of asynchronous communication and synchronous communication in the virtual lobby.

41. The method according to claim 40,

wherein the asynchronous communication includes at least one of electronic mail, message boards for at least one of voice messages and text messages, and whiteboards, and

wherein the synchronous communication includes at least one of real-time aural chat sessions, and real-time text chat sessions.

42. The method according to claim 41, wherein the virtual lobby includes a whisper functionality, for providing private communication relative to any user not engaging the whisper functionality.

43. The method according to claim 36, further comprising:

determining whether the new user has requested to join at least one user in an available virtual room; displaying the available virtual room; and displaying at least one selected graphical representation in the available virtual room.

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44. The method according to claim 43, further comprising:

updating said displaying step at least when one of an existing user requests to exit the available virtual room and another user enters the available virtual room.

45. The method according to claim 44, further comprising:

transferring the exiting user to the virtual lobby.

46. A system for providing at least one chat room for facilitating communication between a plurality of clients in a computer network, said system comprising:

a graphical representation server communicatable and connectable with the computer network and managing avatars of the plurality of clients;

a queue server communicatable and connectable with the computer network and controlling at least one of a speech request queue determining at least in part an order of speaking by the plurality of clients, a text request queue determining at least in part an order of text chatting by the plurality of clients, and a file transfer queue determining at least in part an order of file transferring by the plurality of clients; and

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5 a streaming server communicatable and connectable with the computer network and streaming aural communications to the plurality based, at least in part, on the speaking order determined by said speech request queue.

10 47. A system for providing at least one chat room for facilitating communication between a plurality of clients in a computer network, said system comprising:

15 a server communicatable and connectable with the computer network and managing avatars of the plurality of clients, said server controlling at least one of a speech request queue determining at least in part an order of speaking by the plurality of clients, a text request queue determining at least in part an order of text chatting by the plurality of clients, and a file transfer queue determining at least in part an order of file transferring by the plurality of clients, said
20 server streaming aural communications to the plurality based, at least in part, on the speaking order determined by said speech request queue.

25 48. A method for providing at least one chat room for facilitating communication between a plurality of clients in a computer network, said method comprising:

managing avators of the plurality of clients;

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controlling at least one of a speech request queue determining at least in part an order of speaking by the plurality of clients, a text request queue determining at least in part an order of text chatting by the plurality of clients, and a file transfer queue determining at least in part an order of file transferring by the plurality of clients; and

streaming aural communications to the plurality of clients based, at least in part, on the speaking order determined by the speech request queue for real-time communication.

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49. The method according to claim 32, further comprising:

determining whether any of the plurality of users has issued a text request;

5 duplicating and transmitting, in real-time, text input from a user corresponding to a respective text request to remaining users; and

recording at least one of aural communications and text communications for subsequent retrieval.

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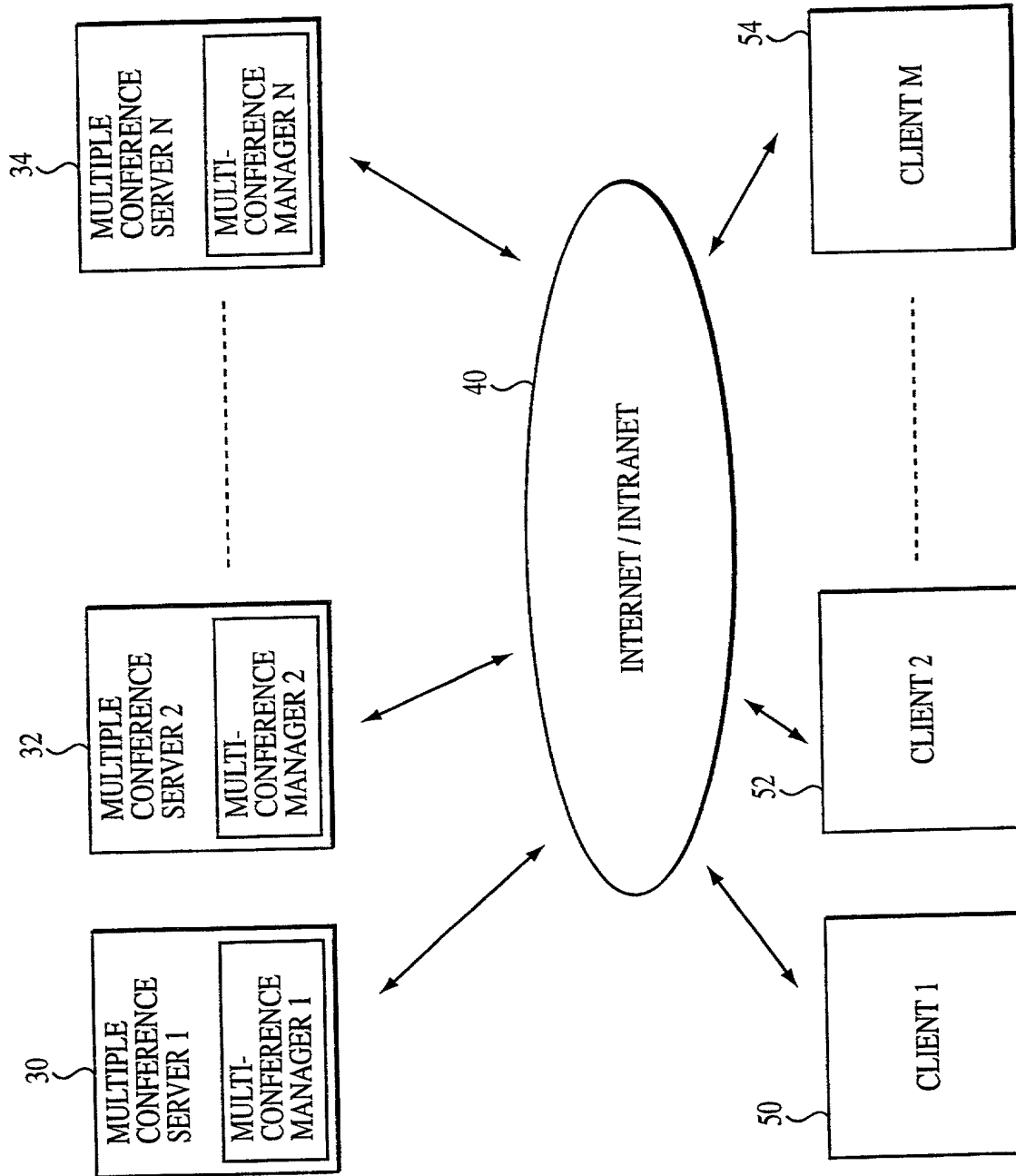


FIG. 1

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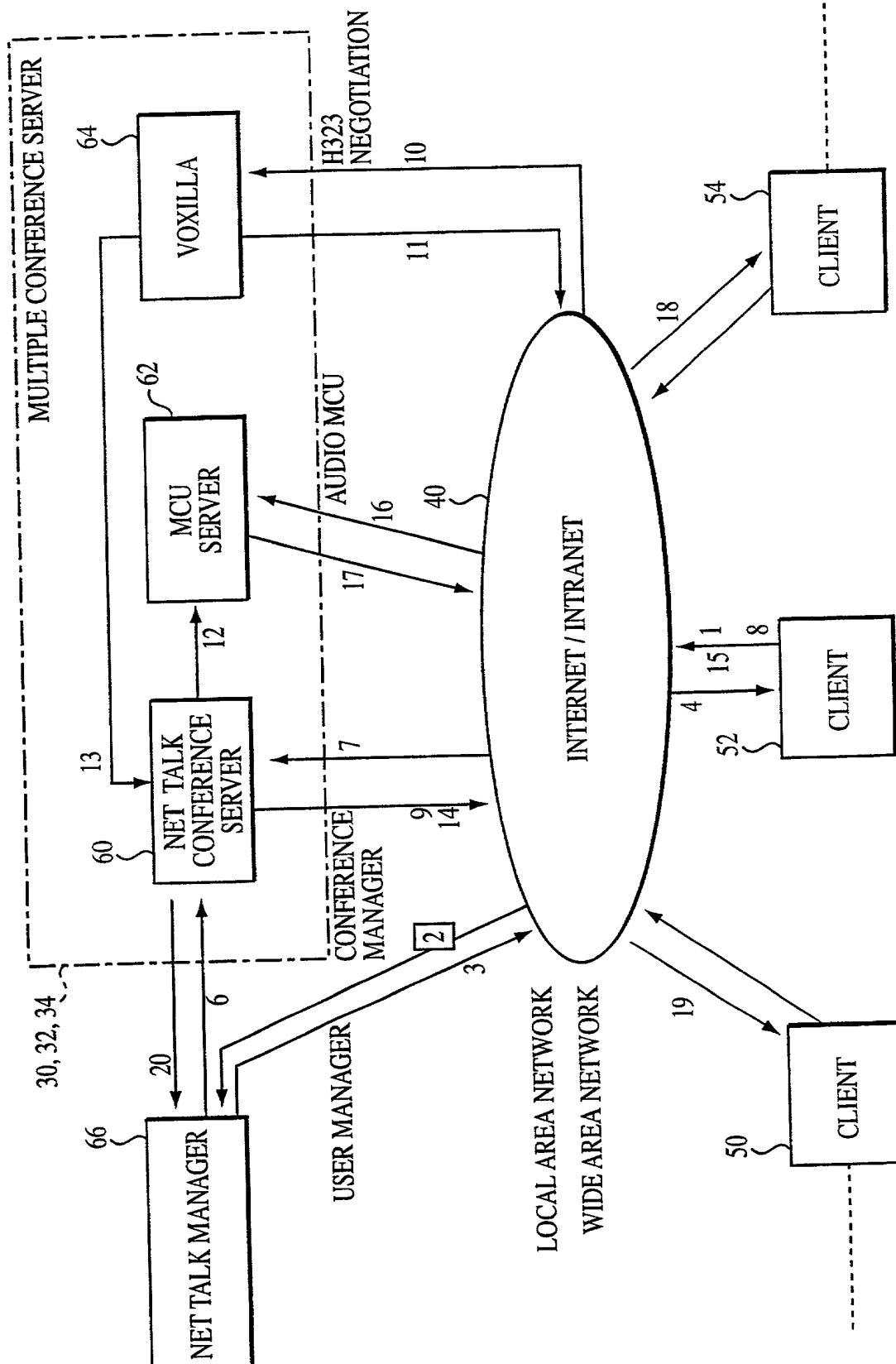


FIG. 2

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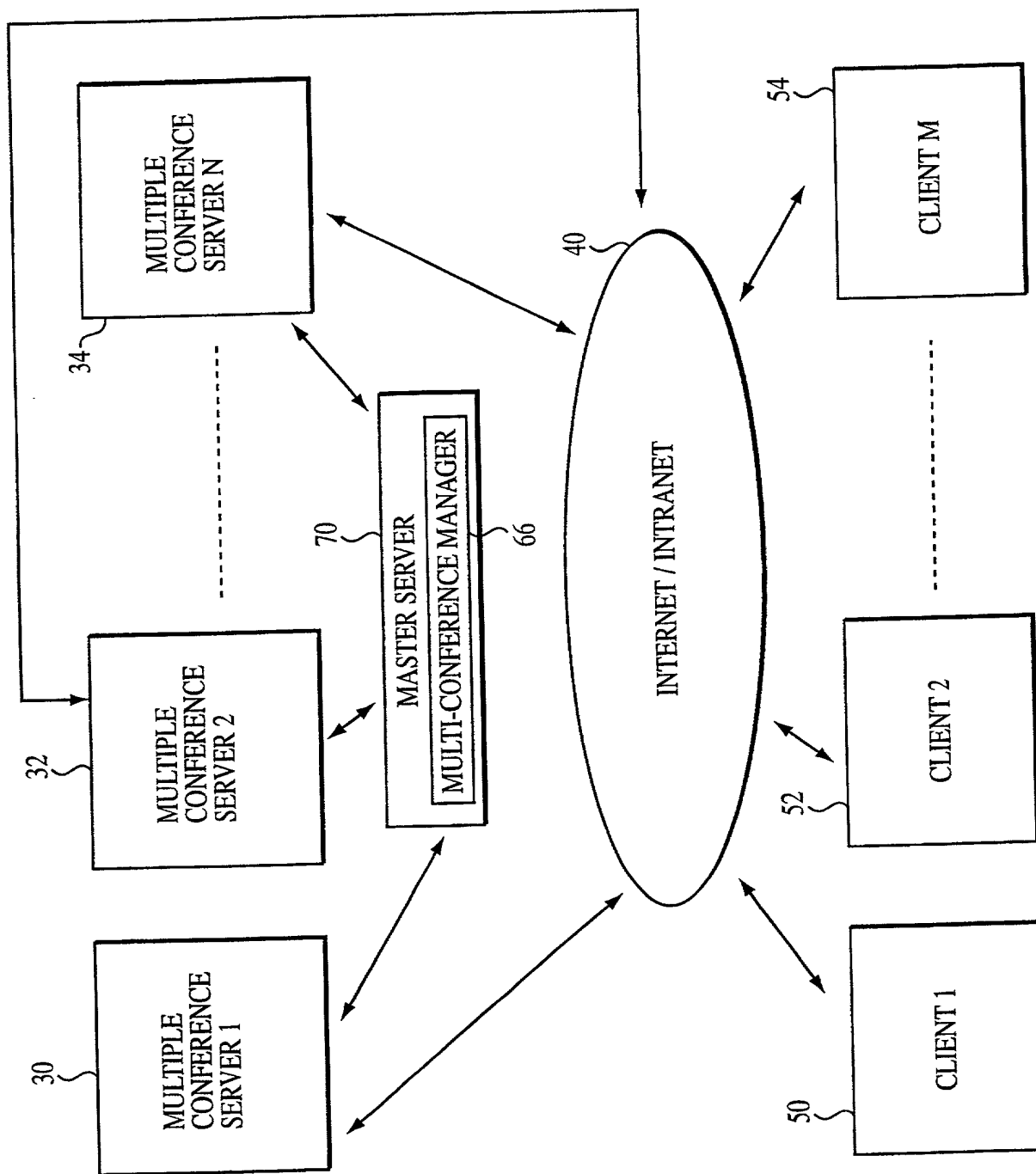


FIG. 3

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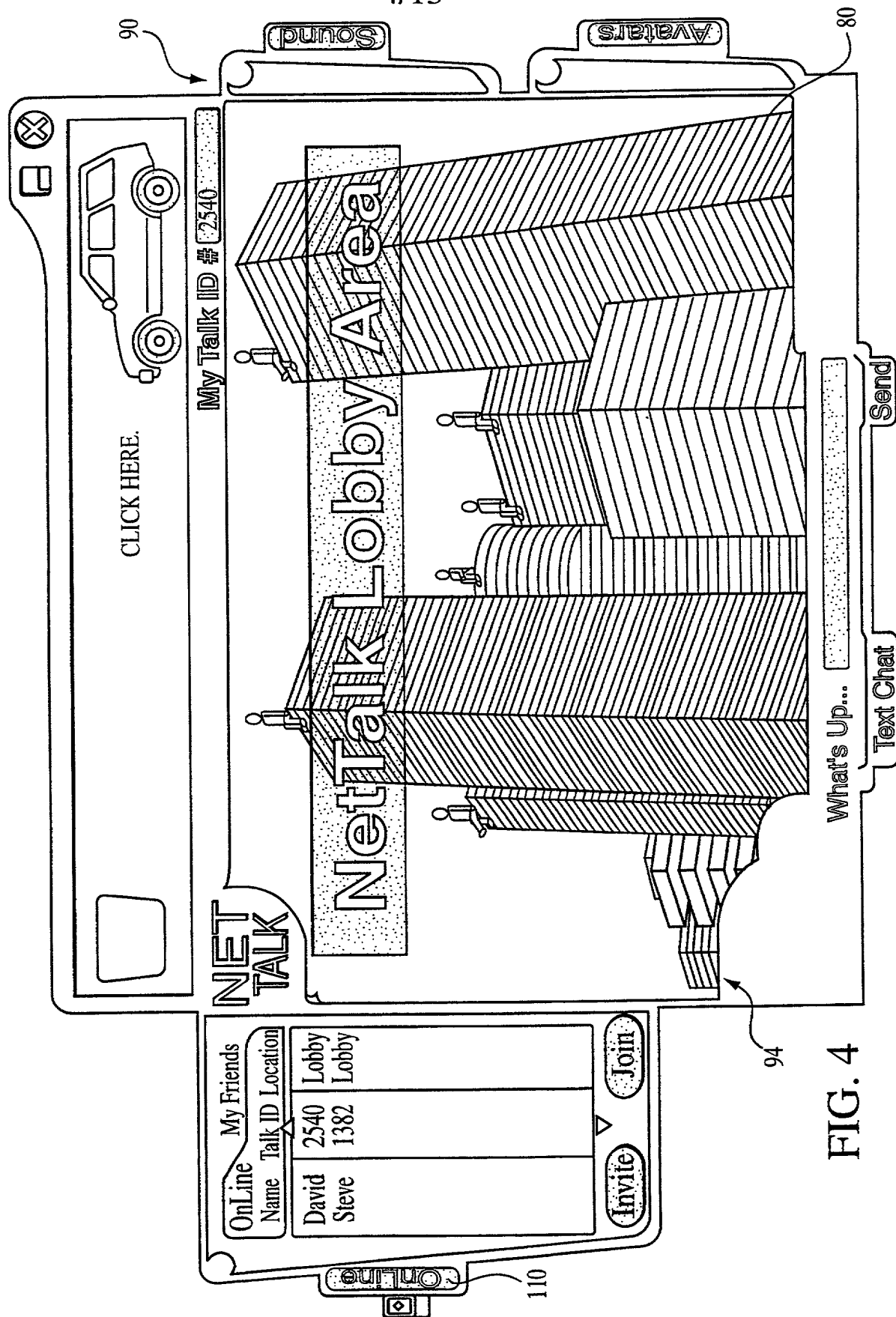


FIG. 4

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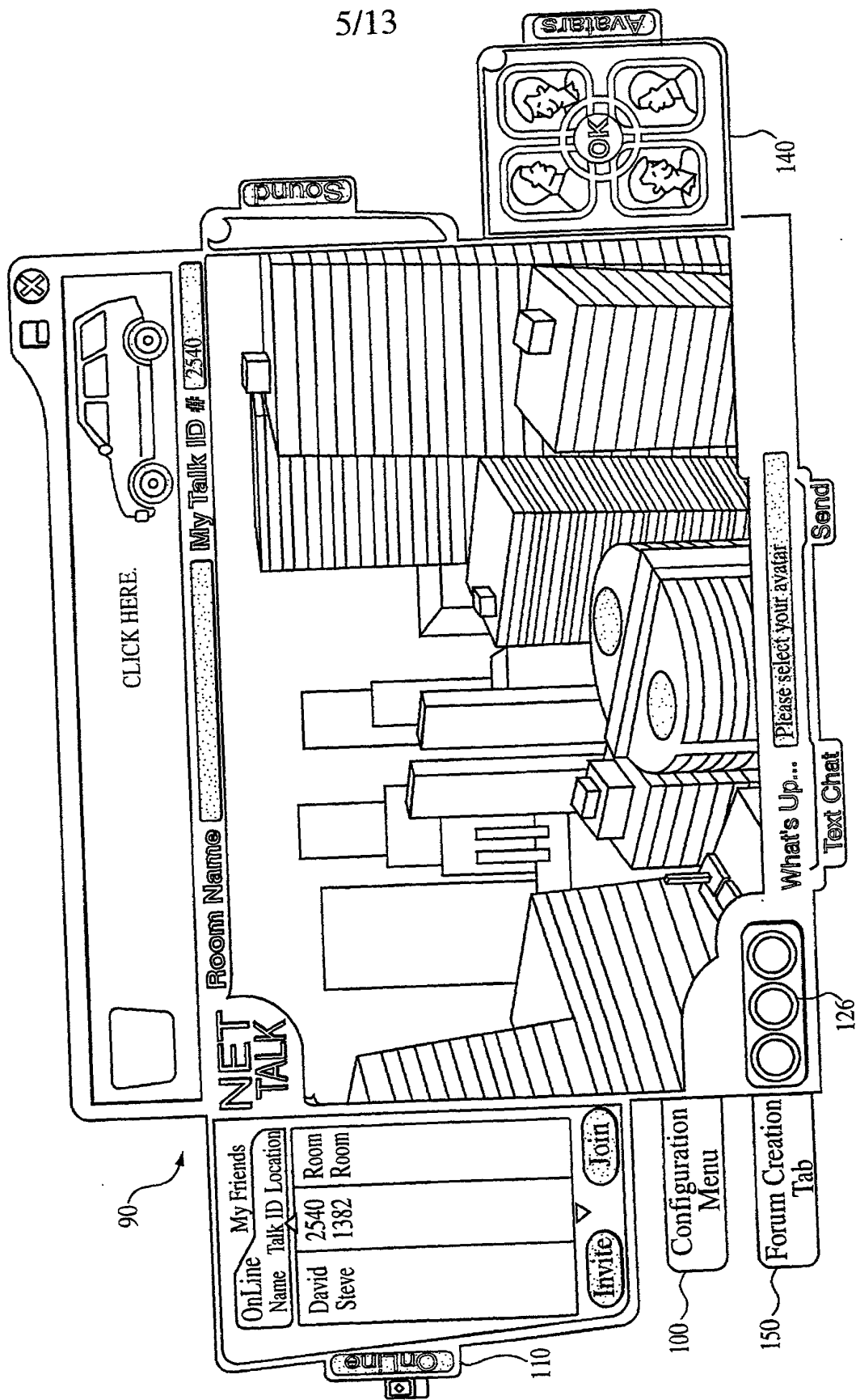


FIG. 5

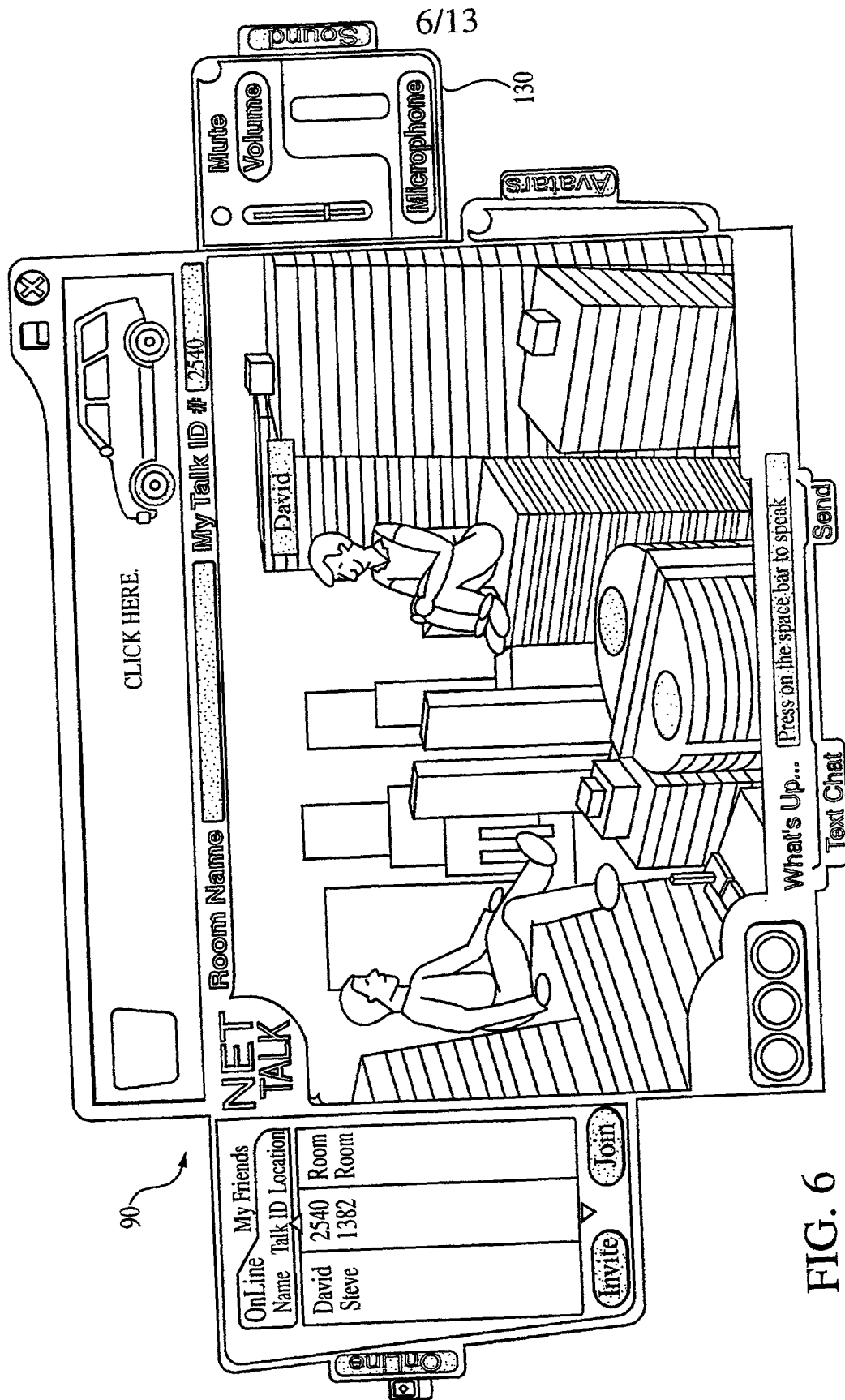


FIG. 6



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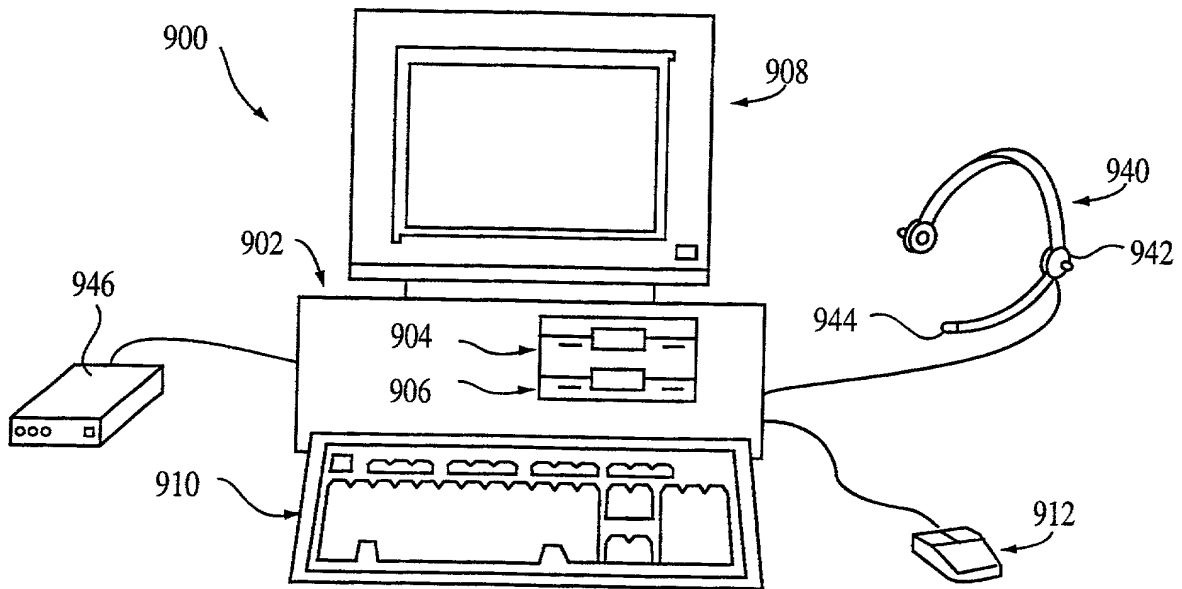


FIG. 8

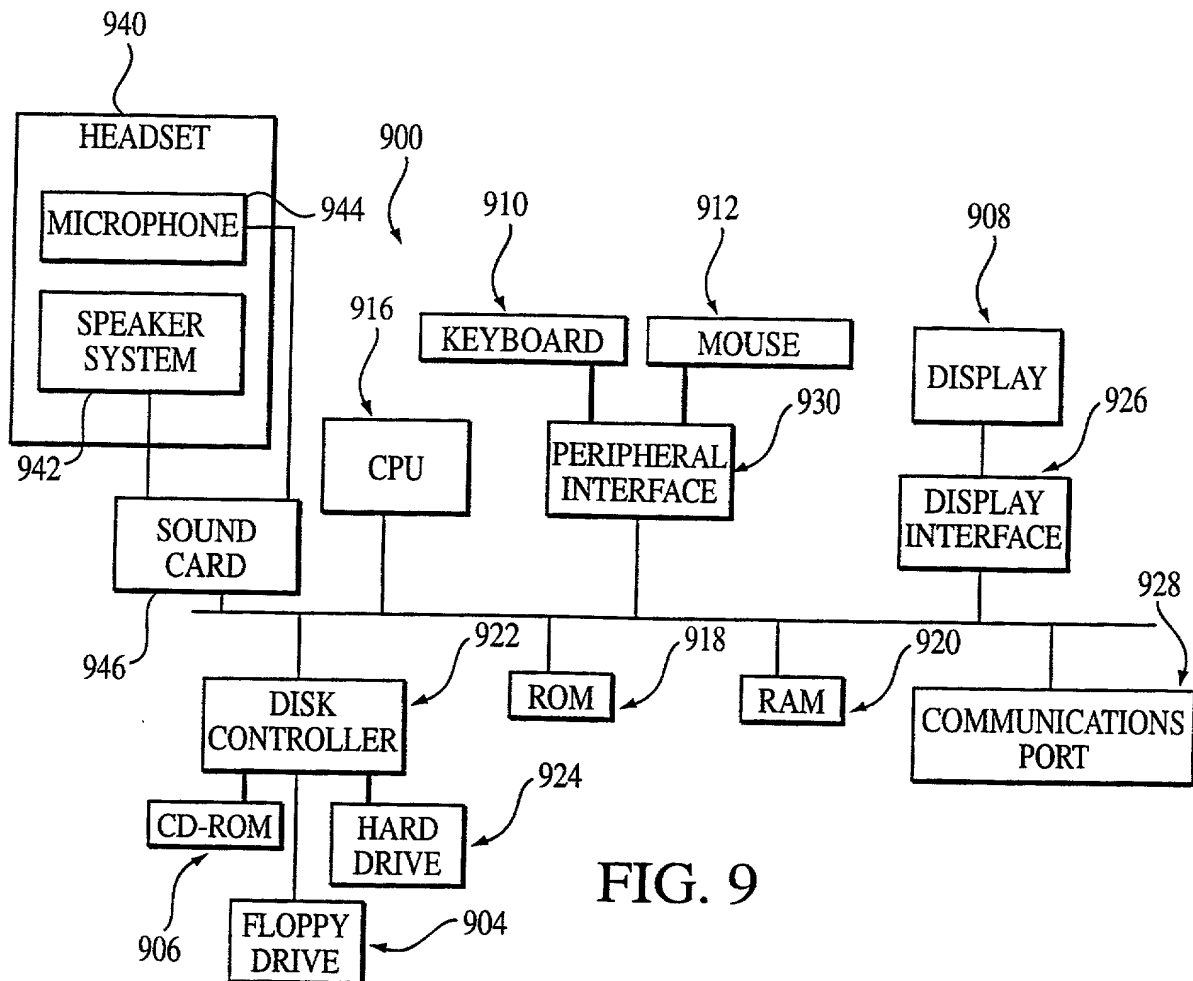


FIG. 9

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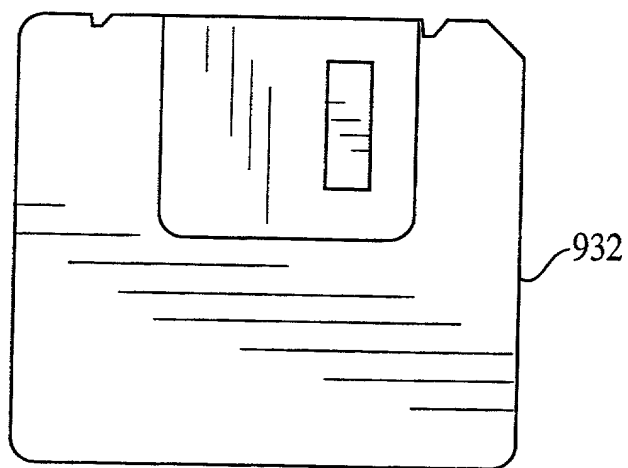


FIG. 10

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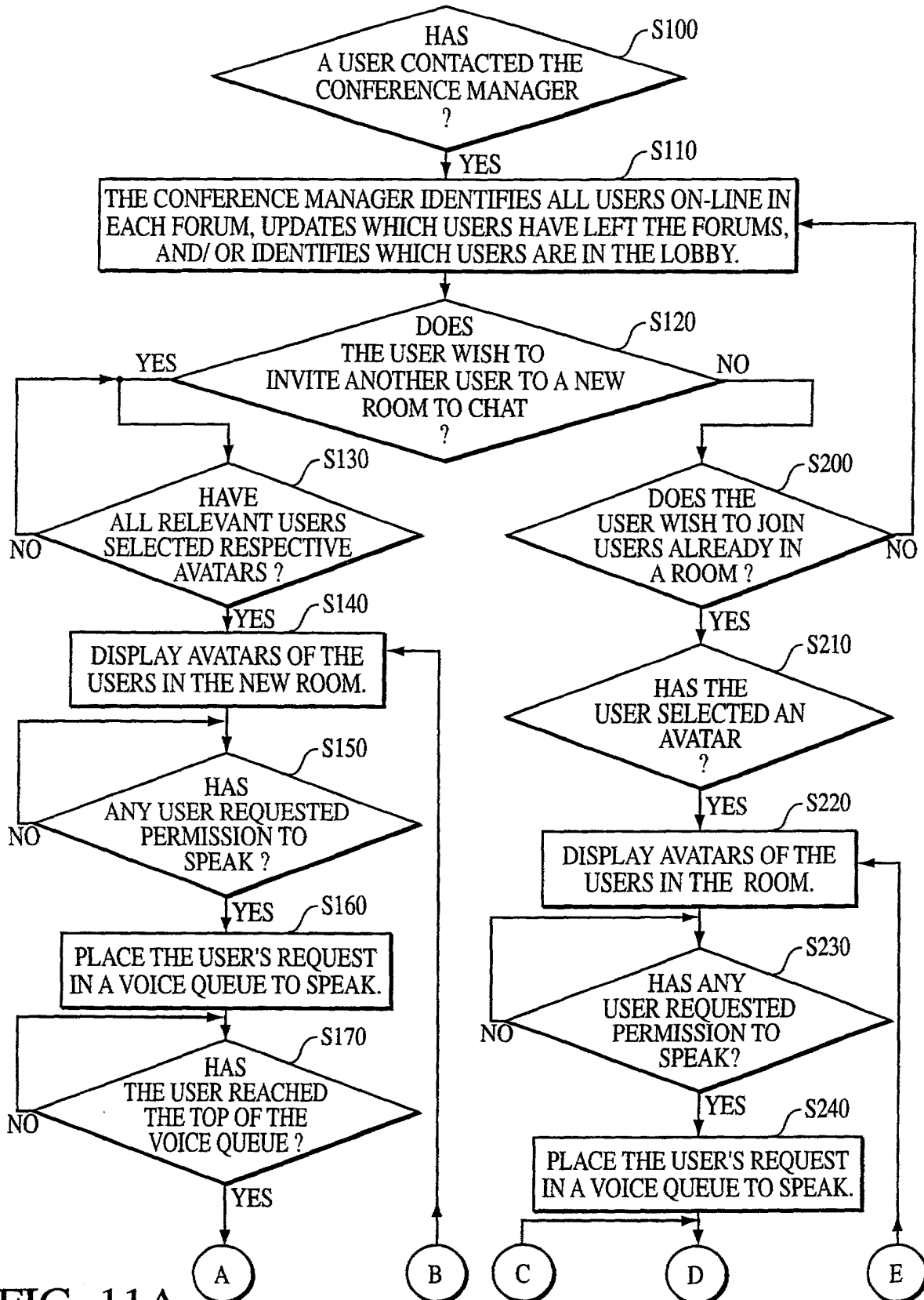
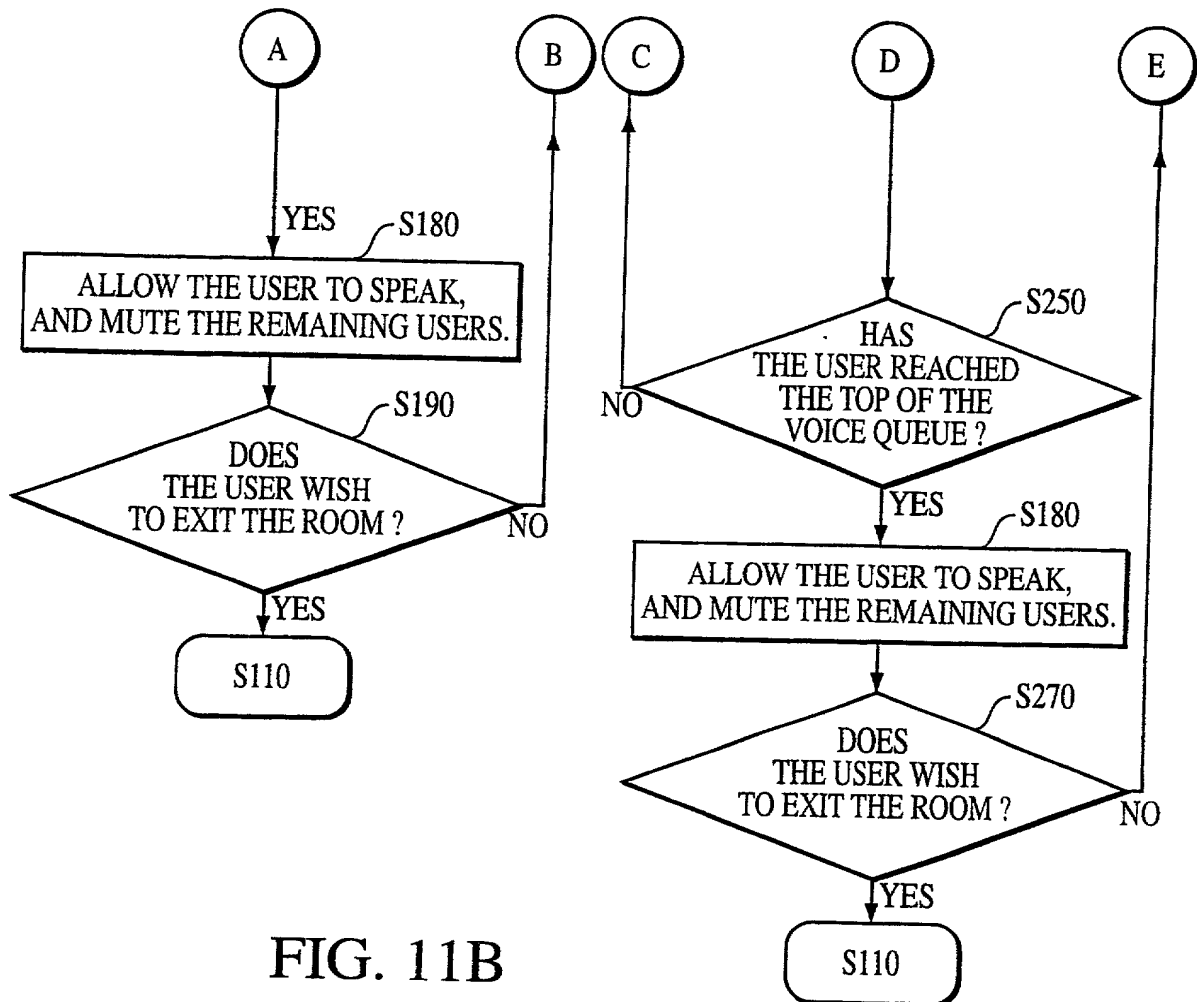


FIG. 11A

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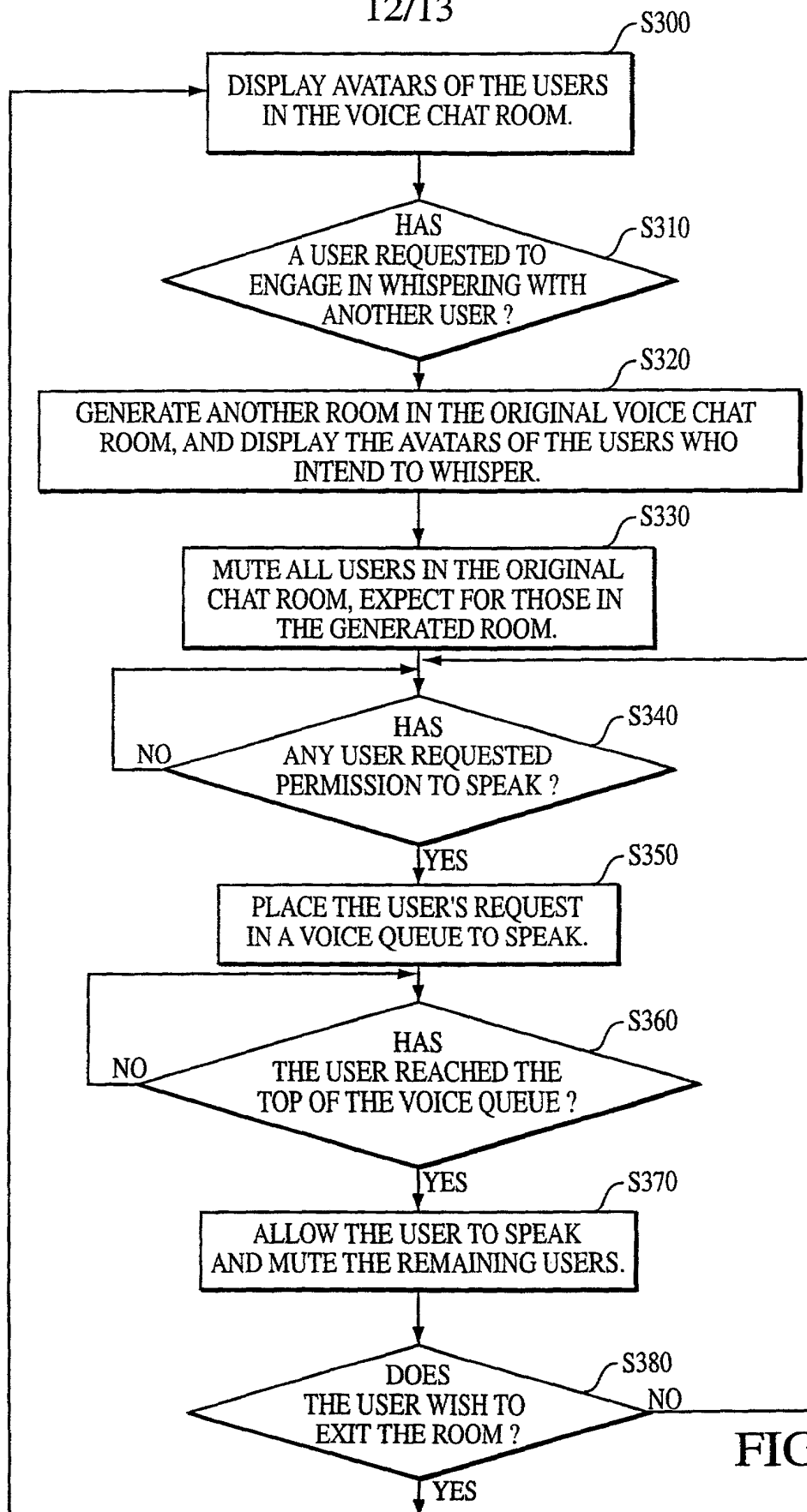


FIG. 12

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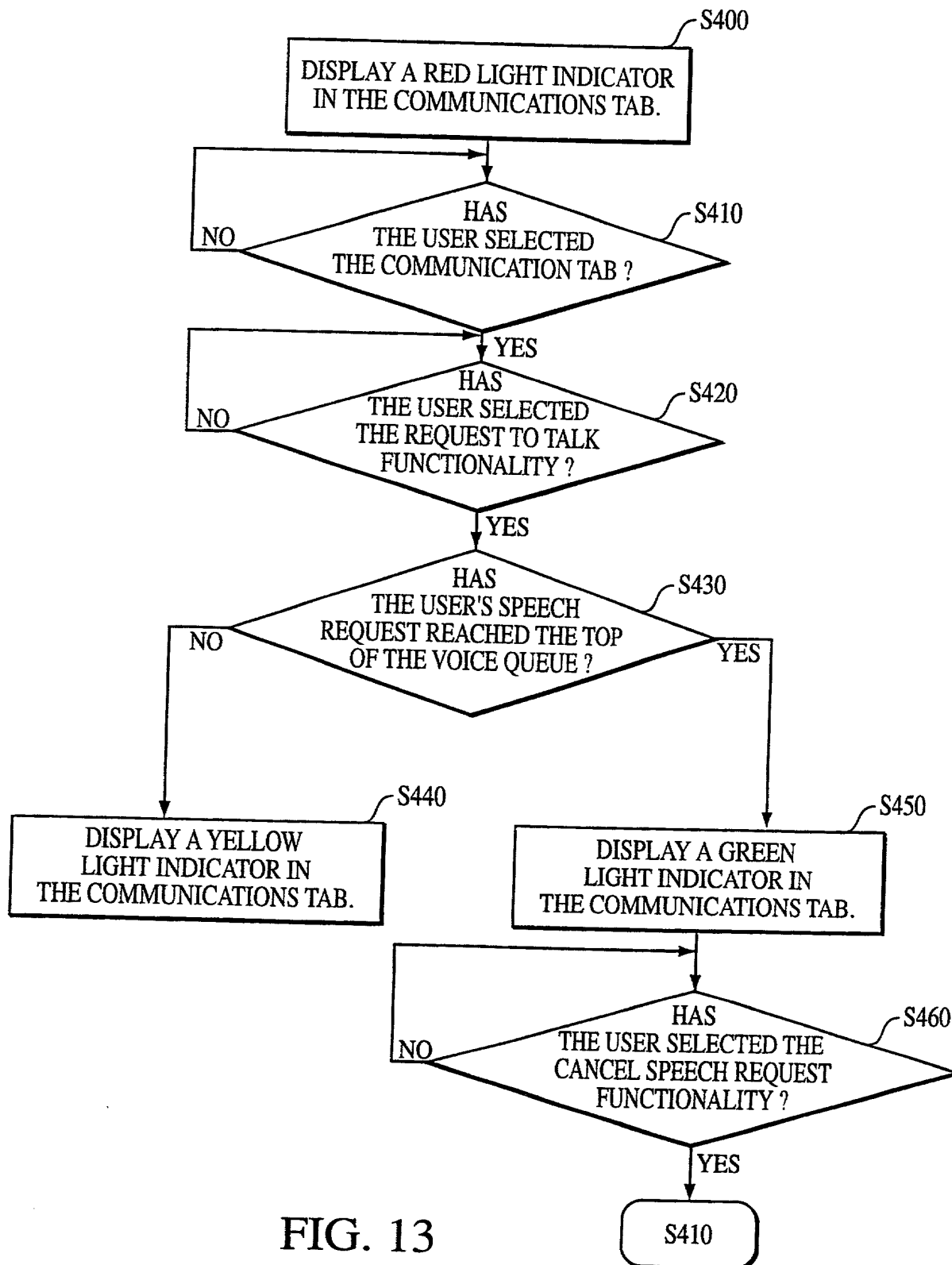


FIG. 13

DECLARATION AND POWER OF ATTORNEY

As below named inventors, We hereby declare that:

My residence, post office and citizenship are as stated below next to my name,

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter claimed and for which a patent is sought on the invention entitled **COMPUTER ARCHITECTURE AND PROCESS FOR AUDIO CONFERENCING OVER LOCAL AND GLOBAL NETWORKS INCLUDING INTERNETS AND INTRANETS**, the specification of which [x] is attached hereto OR [] was filed on, as Application Serial No. and was amended on (if applicable).

I/We hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above.

I/We acknowledge the duty to disclose information which is known to me to be material to patentability in accordance with Title 37, Code of Federal Regulations, Section 1.56(a).

I/We hereby claim foreign priority benefits under Title 35, United States Code, Section 119 of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed:

Prior Foreign Application(s):		Priority Claimed	
<u>Number</u>	<u>Country</u>	<u>Day/Month/Year filed</u>	<u>Yes</u> <u>No</u>

I hereby claim the benefit under 35 USC Section 119(e) of any United States provisional application(s) listed below.

Prior Provisional Application(s):	
<u>Application Number</u>	<u>Filing Date</u>
60/096,865	17 Aug 1998
60/144,729	20 July 1999
60/147,382	06 Aug 1999

I/We hereby claim the benefit under Title 35, United States Code, Section 120 of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code, Section 112, I acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations, Section 1.56(a) which occurred between the filing date of the prior application and the national or PCT international filing date of this application:

Prior U. S. Application(s):		
<u>Serial No.</u>	<u>Filing Date</u>	<u>Status: Patented, Pending, Abandoned</u>
PCT/US9918549	17 Aug 1999	Pending

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Docket No.: 110277.402US1

The undersigned hereby grant(s) the firm of HALE AND DORR LLP the power to insert on this Declaration any further identification, including the application number and filing date, which may be necessary or desirable in order to comply with the rules of the United States Patent and Trademark Office for recordation of this document

I hereby appoint the following attorney(s) and/or agent(s): Irah H. Donner, Registration No. 35,120; Scott M. Alter, Registration No. 32,879; Gregory S. Discher, Registration No. 42,488; Edward D. Grief, Registration No. 38,898; Maria L. Maebius, Registration No. 42,967; Henry N. Wixon, Registration No. 32,073; and Luke J. Yeh, Registration No. 43,296

with full power of substitution and revocation, to prosecute this application and to transact all business in the Patent and Trademark Office connected therewith, and all future correspondence should be addressed to the address at the aforementioned customer number, with full power of substitution and revocation, to prosecute this application and to transact all business in the Patent and Trademark Office connected therewith, and all future correspondence should be addressed to:

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Docket No.: 110277.402US1

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with full power of substitution and revocation, to prosecute this application and to transact all business in the Patent and Trademark Office connected therewith, and all future correspondence should be addressed to the address at the aforementioned customer number, with full power of substitution and revocation, to prosecute this application and to transact all business in the Patent and Trademark Office connected therewith, and all future correspondence should be addressed to:

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